DIA

WORLD

SYNTHETIC

FEBRUARY, 1945

INDIA RUBBER WORLD, February, 1945, Vol. 111, No. 5. Published monthly by BILL BROTHERS PUBLISHING CORP., 386 Fourth Avenue, New York 16, N. Y., U. S. A. Entered as second-class matter December 27, 1944, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; all other countries, $4.00; single copies, 35 cents.

RUBBER CHEMICALS

Check your requirements against these product listings

FOR MANUFACTURING

ACRYLONITRILE — For Buna N type rubbers such as Hycar, Chemigum, Butaprene and Perbunan.

ACRYLIC MONOMERS — Methyl and ethyl acrylate, methyl, ethyl and butyl methacrylate for special-purpose rubbers or elastomer copolymers.

TRITON R-100—An efficient, low cost dispersing agent manufactured by Rohm & Haas. Recommended for latex compounding of GR-S.

PARAPLEX X-100— A new type elastomer developed by The Resinous Products & Chemical Company. Its oil resistance, excellent resilience, lack of sulphur and volatile plasticizers, and fast cure make it particularly useful in specialty compounds.

FOR PROCESSING

TRITONS — Wetting agents are particularly useful in the latex field. Available in anion-active, cation-active, and non-ionic types.

ACRYSOL GS — Sodium salt of polyacrylic acid used in thickening latices or other dispersions.

Plasticizers and Modifiers

MONOMERIC OR ELASTICATOR TYPES

DIBUTYL SEBACATE
DICAPRYL PHTHALATE
DIOCTYL and DIBENZYL SEBACATES
PLASTICIZERS 35 and 36

POLYMERIC OR RESINOUS TYPES

PARAPLEX G-25
PARAPLEX AL-III

FOR FINISHING

PARAPLEX RG-2—Particularly useful as a plasticizer for cellulose resins required for lacquers used to top-coat rubberized articles.

THE AMBEROLS—Used in the manufacture of varnishes for footwear and other rubber articles.

ACRYSOLS C-9 AND ER—These acrylic resin dispersions are useful for base-coats and adhesive work.

THE ACRYLOIDS—The more flexible of these acrylic resin solutions are also used for basecoat work and for improved adhesion to rubber. Non-tacky grades are useful in the manufacture of permanent glossy finishes for rubber articles.

8 awards to The Resinous Products & Chemical Company and its associated firms, Rohm & Haas Company and Charles Lennig & Co.

THE RUBBER CHEMICALS DEPARTMENT

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REG. U. S. PAT. OFFICE

NAFTEX is a unique material—a combination of carbon black and sulfur-reactive plasticizer in the form of free-flowing clean pellets. It is backed by two years of intensive development-aimed at solving some of your most difficult factory handling and processing problems. NAFTEX is a proven product used in large-scale factory production. If you are using SRF or HMF carbon black, NAFTEX can help you.

WHAT NAFTEX WILL DO FOR YOU

1. It will make your factory cleaner. *NAFTEX reduces carbon black dust.*

2. It will increase your mill capacity. *NAFTEX appreciably reduces time of incorporation.*

3. It will eliminate the handling of plasticizers of the viscous-liquid type. *NAFTEX is a dry free-flowing product in pellet form.*

4. It will eliminate the storage, handling, and return of steel drums. *NAFTEX comes in multi-wall paper bags.*

5. It will improve your labor relations. *NAFTEX is liked by the man in the factory.*

THREE TYPES OF NAFTEX ARE NOW AVAILABLE:

NAFTEX SRF 67—⅔ SRF Carbon Black and ⅓ Sulfur-Reactive Plasticizer.

NAFTEX SRF 75—¾ SRF Carbon Black and ¼ Sulfur-Reactive Plasticizer.

NAFTEX HMF 67 — ⅔ HMF Carbon Black, ⅓ Sulfur-Reactive Plasticizer.

Write for samples.

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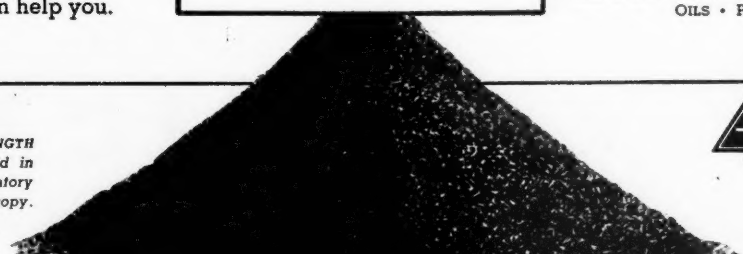
WILCHEM PRODUCTS: NAFTOLEN • NAFTEX MULTI-PLAST • ECONO-PLAST • NAFTOLEN EMULSION • WILMEX • WILCOR RECLAIMING OILS • POLY-TINT

The booklet, "TENSILE STRENGTH TABLE," designed as an aid in your physical testing laboratory is available. Write for your copy.



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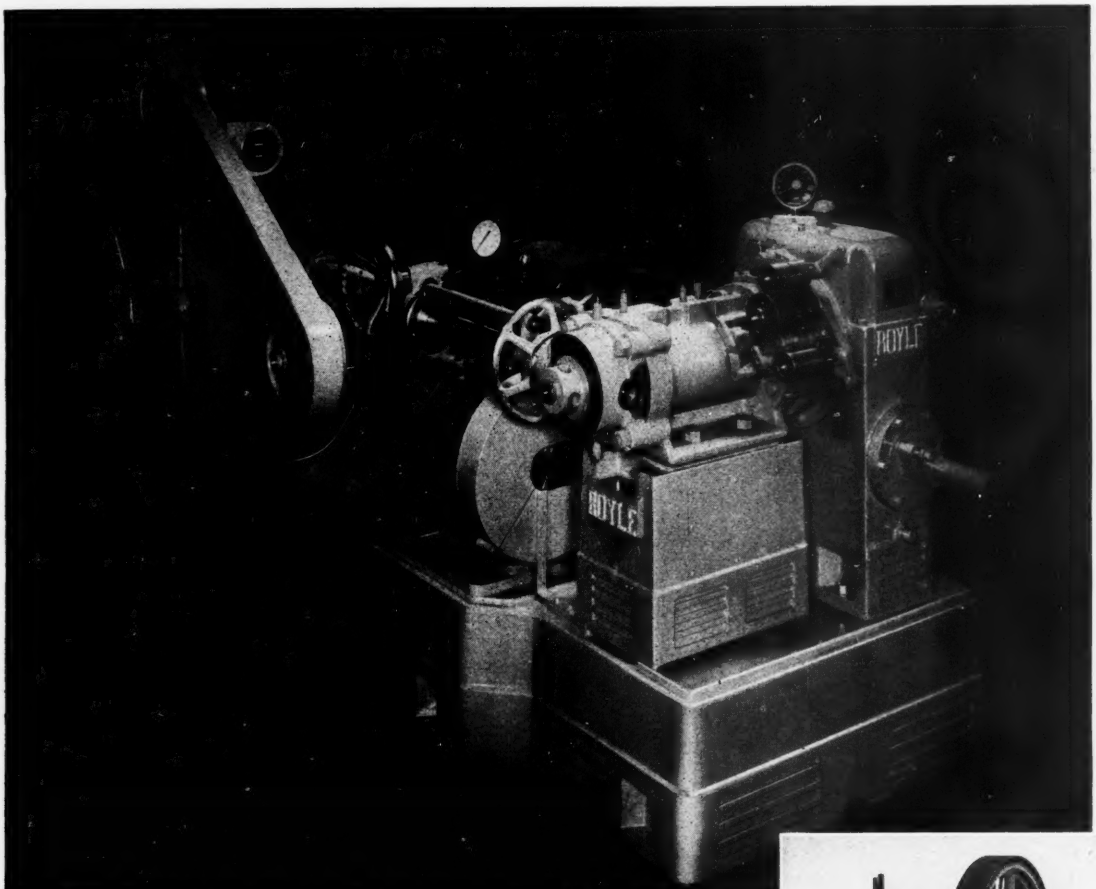


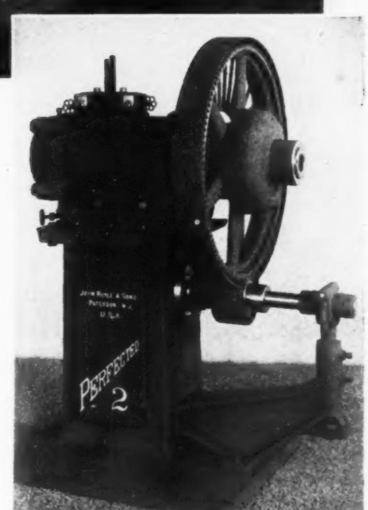
No. 2 Royle Continuous Vulcanizing Machine equipped with Stock Screw Speed Tachometer and Sperry Exactor Control.

Built for Years of Service

Recently a customer asked if certain alterations could be made to one of his tubing machines. A check of our records revealed that the machine was shipped in July, 1893—nearly 52 years ago.

It is encouraging to know that there are Royle "old timers" still capable of doing their bit on the "production front" after more than a half-century of service.

Today, as always, our skills are devoted to designing and building continuous extrusion machines to meet the specific requirements of the application involved. The "know how" acquired over the years is built into Royle equipment—reflected in performance records.



An Early No. 2 Royle "Tuber"

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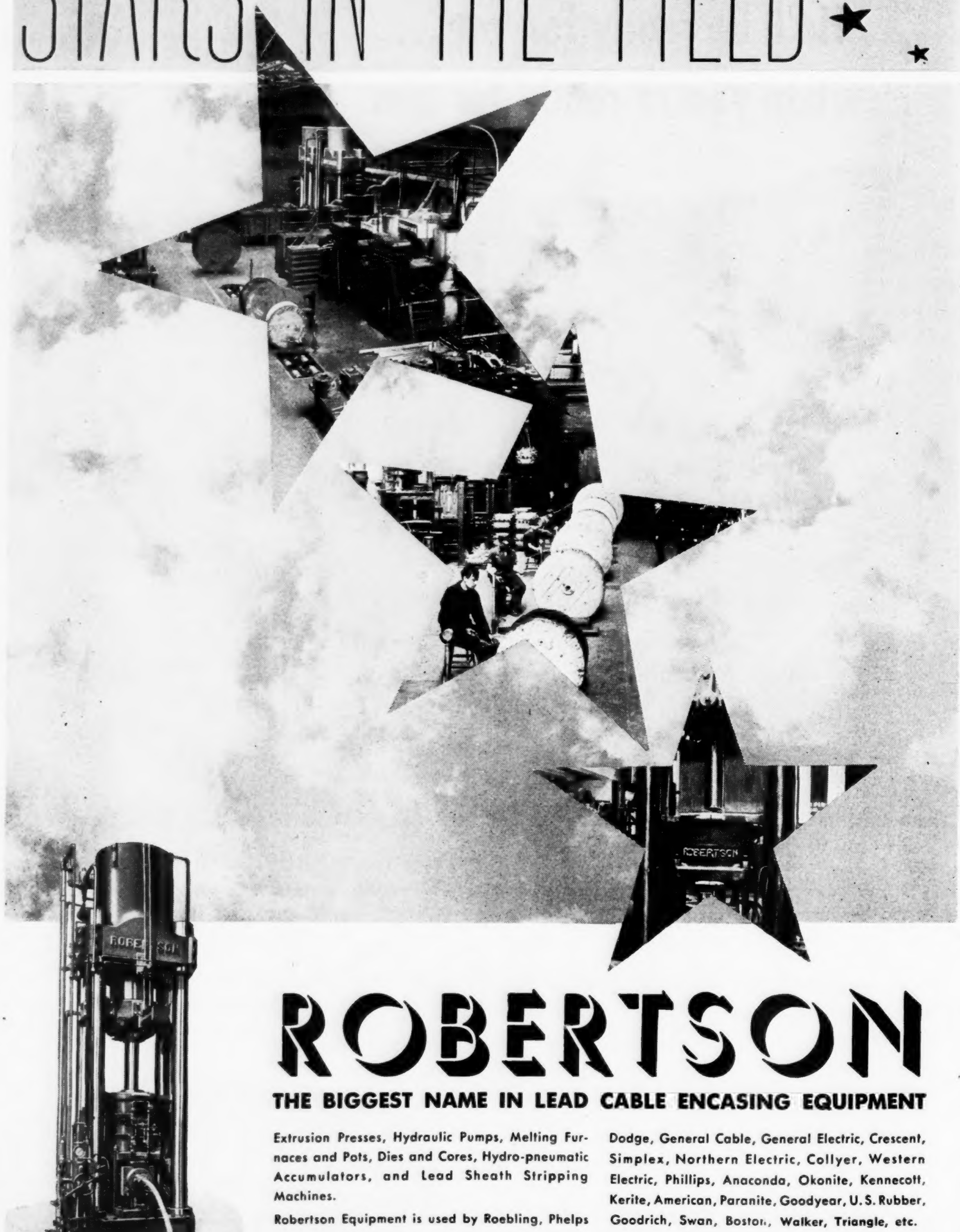
THE experienced workman in the picture is one of the "facilities" that Philadelphia Rubber will have "available" for you as soon as the war ends and you resume the making of rubber products for normal peacetime consumption. He's typical of the *experience* that can be found throughout the Philadelphia Rubber organization.

Some of this experience is new—and has been translated into *new* knowledge of reclaim compounds. For example, Philadelphia Rubber's accelerated research with GR-S has established several important facts that will mean lower cost of your finished postwar products. That, in turn, will improve your sales position in the competitive market that is sure to return.

But back of all this new knowledge is the accumulation of years of experience with reclaimed rubber. There is no organization in this country better equipped to help you with problems involving the use of reclaim. Let this skilled, experienced workman represent our sincere invitation to you to make use of our laboratory staff and facilities in solving any reclaim problems that you may have now or in the future. The Philadelphia Rubber Works Company, 324 Rose Building, Cleveland 15, Ohio.

PHILADELPHIA
RECLAIMED RUBBER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1920


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CARBON BLACKS
INCREASE the Life Factor
DECREASE Heat Generation
In ALL Tire Formulations...
ONE OF THESE "EASY PROCESSING" CARBON BLACKS MAY BE THE ANSWER TO YOUR PROCESSING PROBLEM
CONTINENTAL "AAA"—Low heat generating—extremely easy processing.
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Preferred by leading manufacturers, Continental's complete line of "easy processing" carbon blacks meet every processing need. Investigate the superior characteristics of these high grade blacks in terms of your own product requirements. Trial samples will be sent promptly on request.
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How to step up strainer output

Above — National 8½" Heavy Duty Strainer with air-operated intermittent cut-off.

Inset — Close up of Quick-opening strainer head equipped with motor driven continuous cut-off

NATIONAL RUBBER strainer heads have been re-engineered for more efficient operation. Power-operated and precision built, these new clamp-type heads swing open quickly and smoothly, greatly reducing the downtime of the machine. Screen changes that once took five to ten minutes, and more, now are being made in less than one minute.

When condition of the stock calls for screen changes every 20 to 30 minutes, these fast-opening heads are adding five to six hours useful production every 24 hours.

The ease and simplicity with which these new heads can be opened encourages operators to change screens frequently and so maintain production, rather than wait until the screen becomes so clogged that output is cut down to a fraction of what it should be.

Because of the time and labor saved, National Strainers are being hailed by users as one of the most important recent developments in rubber reprocessing.

This is a typical example of National Rubber's creative engineering . . . it is developments of this kind, by working hand in hand with rubber company engineers, that have established National's leadership in the rubber machinery field.

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Creative Engineering

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SAVE THIS LISTING...

BARRETT RUBBER COMPOUNDING MATERIALS FOR SYNTHETIC, NATURAL AND RECLAIM STOCKS

Barrett Rubber Compounding Materials are the result of many years of continuing research and successful manufacturing experience. These hydrocarbons and oils are useful in processing every type of rubber and impart the wide variety of desirable characteristics suggested in the following chart.

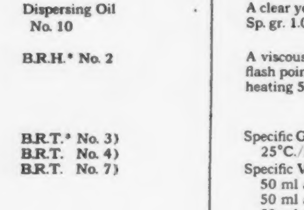
RUBBER COMPOUNDING MATERIALS	Specific Gravity 25°C./25°C.	Softening Point. Ring and Ball in Glycerine	Insoluble in Benzene	
Carbonex* Flakes	1.28 to 1.38	205 to 220°F.	40.0 to 44.0	Carbonex is valuable for its properties of improving processing and extruding, especially in all reclaim and synthetic rubber compounds. Products compounded with Carbonex are tear and abrasion resistant. Reduces "nerve" and shrinkage in GR-S stocks, has good resistance to the action of acids, alkalis, oils, greases. Used in mechanical, footwear and extruded compounds.
Carbonex S Flakes	1.28 to 1.38	205 to 220°F.	40.0 to 44.0	A form of Carbonex modified with 5% of fatty acid, it differs from Carbonex in its greater ease of milling into plantation, reclaimed or synthetic rubbers. May be dispersed in all reclaim rubber compounds in a Banbury mixer.
Carbonex S Plastic	1.26 to 1.36	175 to 185°F.	38.0 to 43.0	May be dispersed in all-reclaim rubber compounds on open mills.
Bardol*	A dark colored coal-tar oil with high content of aromatic hydro-carbons. Characterized by a sp. gr. of 1.07-1.12, low viscosity at 40°F. Minimum distillation to 355°C. is 60%.			A wetting and dispersing agent for carbon black and clay and a softener for synthetic rubbers. Dispersing action promotes high abrasion and wear resistance, high strength and modulus.
Bardol B	A clear yellow product of coal-tar oil. Sp. gr. 1.00 to 1.04. Distils between 230-310°C.			Exhibits effective swelling and wetting action on rubber and fillers. A softener for synthetic rubbers, inner tube stocks, rubberized fabric and sundries. Non-staining.
S.R.O.*	A tar oil product liquid at 40°F. Sp. gr. 1.04 to 1.09, viscosity lower than B.R.V.			Penetrating qualities of S.R.O. make it desirable in reclaiming operations. It imparts good plasticity.
Dispersing Oil No. 10	A clear yellow-red product of coal-tar oil distilling approx. 210-320°C. Sp. gr. 1.00 to 1.05.			A reclaiming product with good dispersing and plasticizing properties. Also a good softener for synthetic rubbers.
B.R.H.* No. 2	A viscous fluid asphaltic product. It has a sp. gr. of approx 1.0; min. flash point of 400°F. and a max. evaporation loss of 1% in 5 hours on heating 50 grams at 163°C.			A rubber tackifier to improve calendering, flowing and molding properties. Used in reclaiming operations, adhesives and adhesive tapes and many other operations where a non-drying softener is desired.

B.R.T.* No. 3, B.R.T. No. 4, B.R.T. No. 7 — The B.R.T. series offers refined coal-tar softeners with different viscosities, distillation ranges and carbon disulfide insoluble contents. Choice depends on the requirements of the particular problem. These materials have a dual function in that they serve as both softener and extender.

	B.R.T. No. 3	B.R.T. No. 4	B.R.T. No. 7
Specific Gravity 25°C./25°C.	1.15 to 1.20	1.15 to 1.20	1.20 to 1.25
Specific Viscosity, Engler			
50 ml at 40°C	13 to 18		
50 ml at 50°C		15 to 30	
50 ml at 100°C			6 to 9
Insoluble in Carbon Disulphide, % by weight	4 to 10	4 to 10	15 to 20
Water, % by volume maximum	3.0	3.0	0.1
Distillation, % by weight			
Maximum to 170°C	5	2	1
Maximum to 270°C	25	20	13
Maximum to 300°C	35	30	25
Softening Point, Ring and Ball Distillation Residue at 300 C Degrees Centigrade	30 to 60	35 to 65	35 to 65

B.R.V.*	A dark coal-tar oil of high-boiling range and a sp. gr. of 1.14 to 1.18. Distils not more than 28% at 355°C.	In rubber reclaiming operations based on its ready dissolving action on rubber. Imparts good tensile and aging properties in rubber, also a good softener in synthetic rubbers.
Reclaiming Oil No. 1621	A clear oil distillate with a sp. gr. of 0.89 to 0.94. Distillation range 150-220°C. Min. flash point 100°F.	In rubber reclaiming in both the digestor and pan methods.
Bardex*	A viscous fluid compounded from coal-tar products. Sp. gr. is 1.07 to 1.12. Benzene insoluble 1% max.	In rubber reclaiming in both digestor and pan methods and in general rubber compounding.
B.R.C.* No. 20	Solid coal-tar hydrocarbon. 15-25% insoluble in CS_2; sp. gr. 1.25 to 1.32. Softening point ...	...tural and synthetic rubber compounds to promote ...working characteristics ...

Reprinted from the current listing of Barrett Chemicals in Chemical Engineering Catalog.



If you would like a complete listing and reference manual on coal-tar chemicals, write for our new free booklet—"Barrett Chemicals for Industry."

THE BARRETT DIVISION

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Barrett


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+50

FOR COMPOUNDING THE BUTADIENE COPOLYMERS

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IMPROVE PROCESSING CHARACTERISTICS
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Achieve uniform vulcanization, resulting in:

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Produced in three modifications to meet the varying requirements encountered in rubber manufacture.

	VULTAC #1	VULTAC #2	VULTAC #3
Type Alkyl Phenol Sulfide	Monosulfide	Disulfide	Disulfide
Sulfur content	13%	23%	28%
Color and form	Soft brown resin	Hard brown resin	Hard brown resin
Softening point ASTM E28-36T	45-55°C	55-65°C	70-80°C
Specific Gravity 25/25°C	1.11-1.12	1.16-1.17	1.19-1.20
Recommended Use	General Purpose Vulcanizing Tackifier	Primary Vulcanizing Agent for GR-S	Primary Vulcanizing Agent for Buna N polymers
Recommended Proportion	10-25 parts PHR with decreased sulfur	6-10 parts PHA	5-9 parts PHR

SHARPLES CHEMICALS INC.

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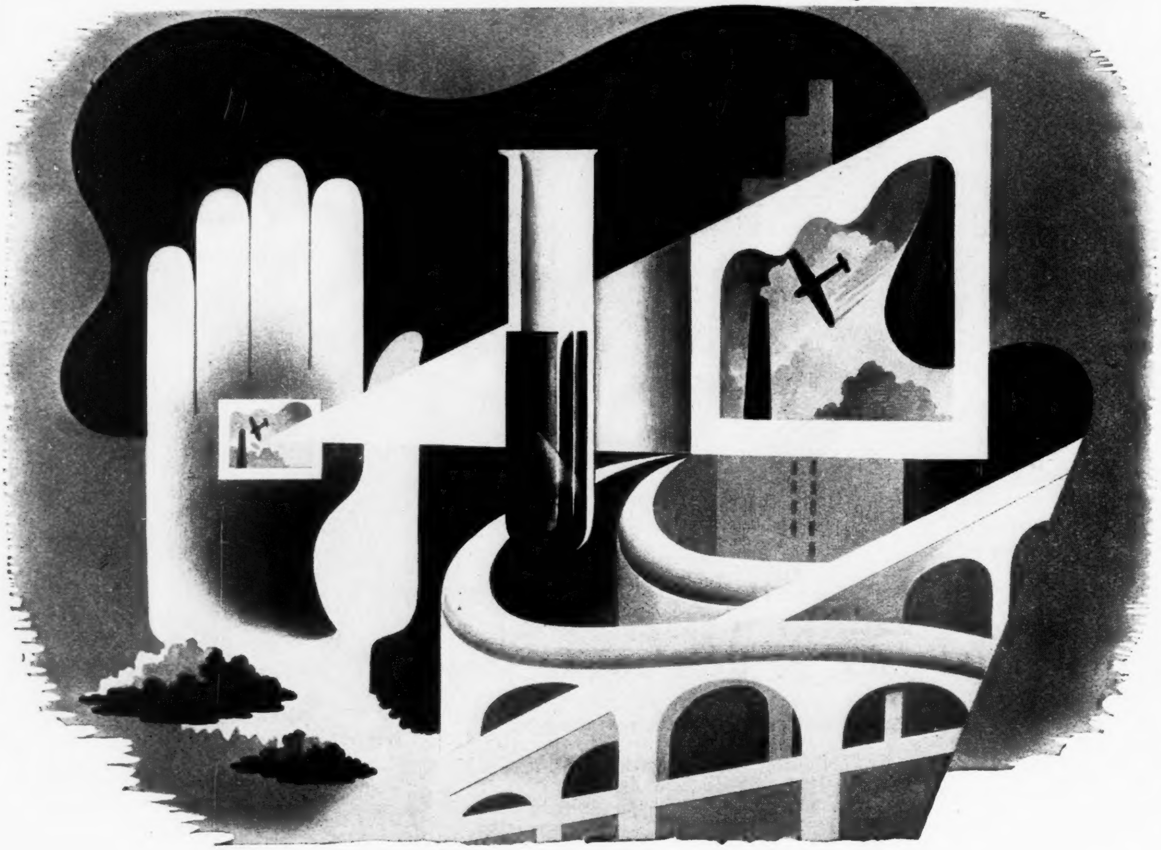
SHARPLES TRADE MARK CHEMICALS



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WHITE
Rubber
OUTLOOK...
Rubber manufacturers who took pride in the appealing brilliance of their prewar white and tinted rubber products may look to the future with confidence.
When natural rubber again is available in quantity TITANOX will be in a better position than ever to play its important role in the making of whiter and brighter rubber goods.
The high tinting strength, fine particle size and reinforcing qualities of TITANOX pigments again will contribute to more desirable finished products.
Meanwhile the TITANOX laboratories are turning their full energies to the solution of the problem of whitening synthetic rubber compounds.
Pending the realization of success in these studies it is well to remember that as TITANOX has the greatest whitening effect on natural rubber so also it has on synthetic and reclaim.
Our Rubber Service Department invites technical inquiry.
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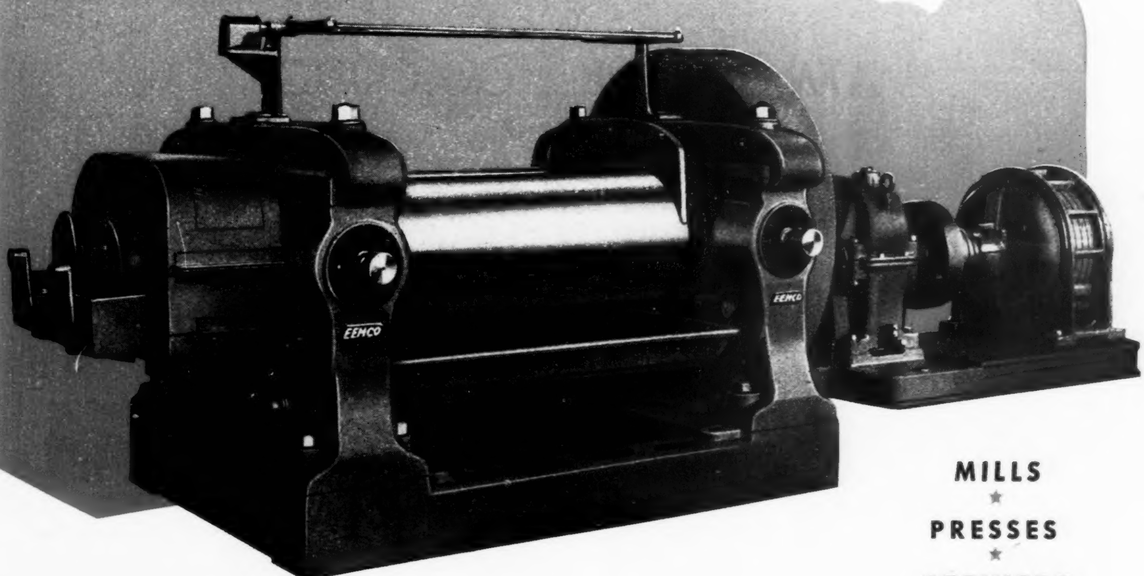
Mills for mixing and compounding ALL KINDS OF RUBBER and PLASTICS



MILLS ★ **PRESSES** ★ **REFINERS** ★ **WASHERS** ★ **EXTRUDERS** ★ **STRAINERS** ★ **CALENDERS** ★ **TUBERS** ★ **CRACKERS**

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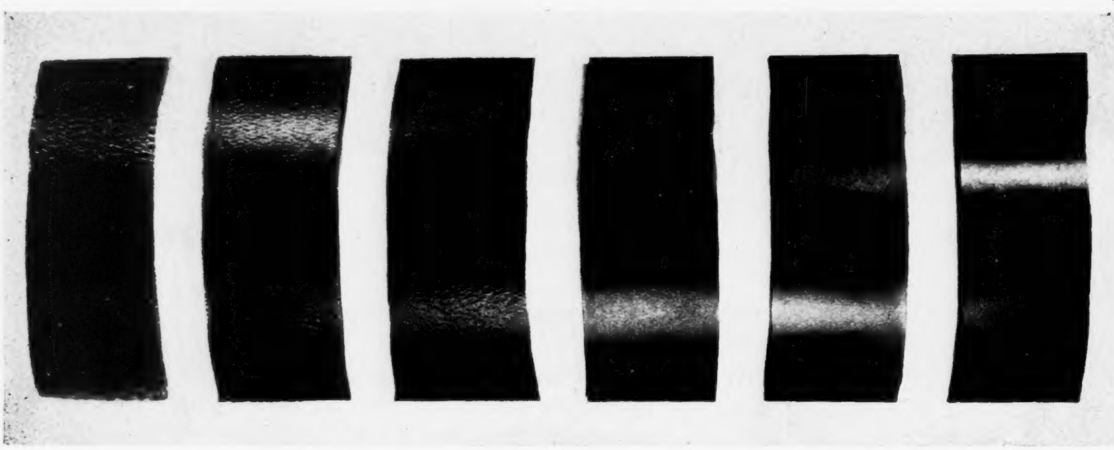
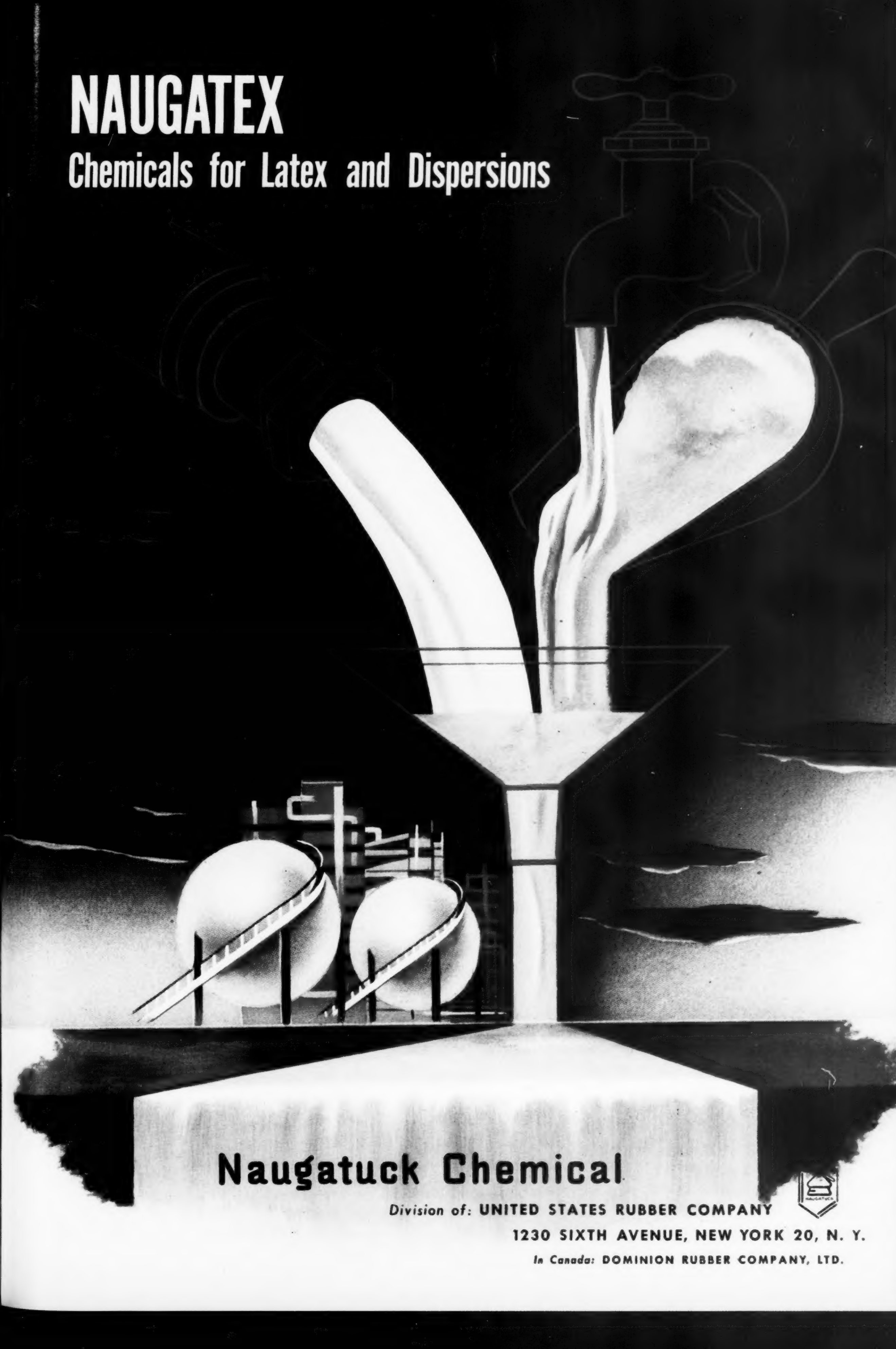


Control (no wax)	Paraffin 4%	Antisol 1%	Antisol 2%	Antisol 3%	Antisol 4%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Sulfur: Commercial Rubbermakers' and other grades.

Sulfuric Acid: All grades and strengths.

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Fluosulfonic Acid: For production of Boron Trifluoride.

Potassium Cyanide—Sodium Cyanide: In production of acrylonitrile rubbers.

Copper Fluoborate—Zinc Fluoborate—Copper Cyanide—Sodium Cyanide: Intermediates for "plating" rubber to metals.

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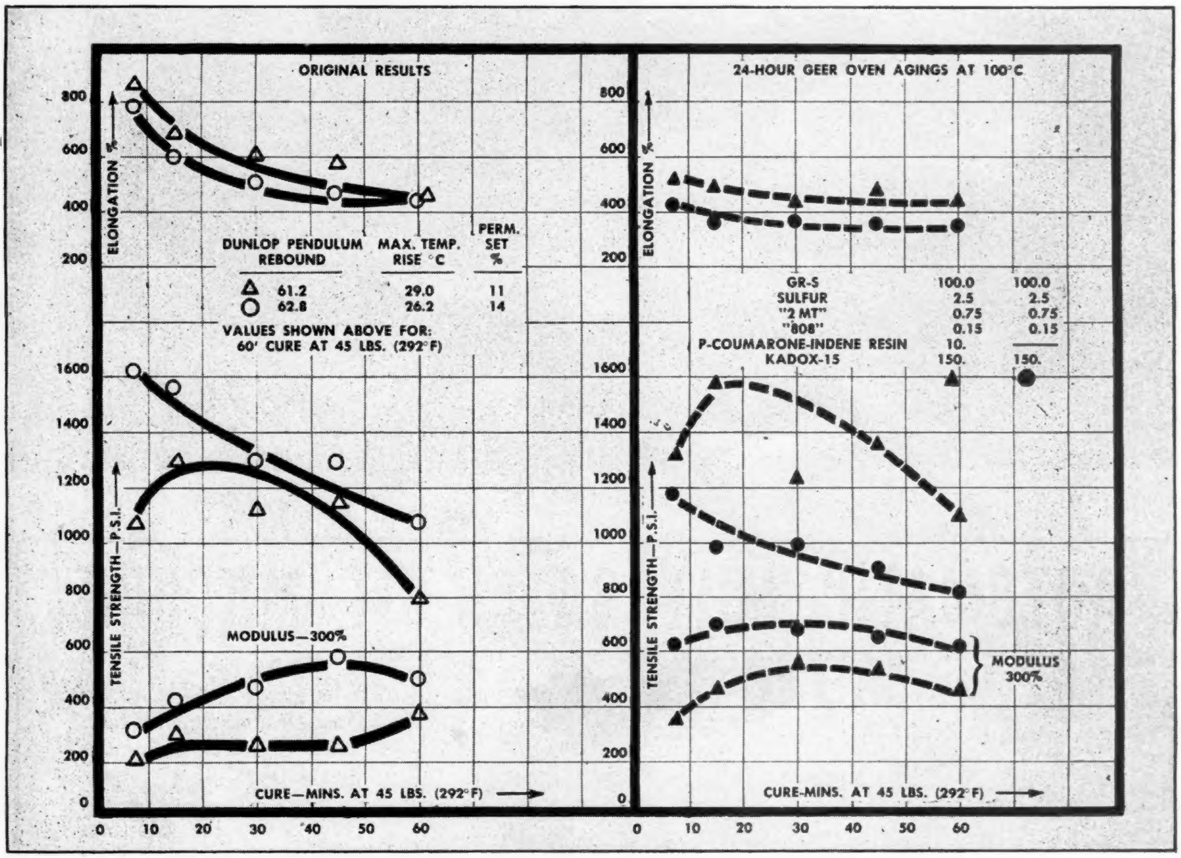
Technical Bulletin No. 7

on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

"2MT"-"808" ACCELERATION

Effect of p-coumarone-indene resin on initial and aged properties



In the absence of p-coumarone-indene resin, the tensile strength "peaks" at an early cure and progressively declines during the 60 minute interval. The 24-hour Geer aging results at 100°C. show correspondingly lower values.

The addition of 10 parts of p-coumarone-indene resin, however, flattens out the initial curing curve and the aged values are higher than the original results. The modulus after aging of the compound containing p-coumarone-indene resin is advantageously lower than the control.

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New Jersey Zinc

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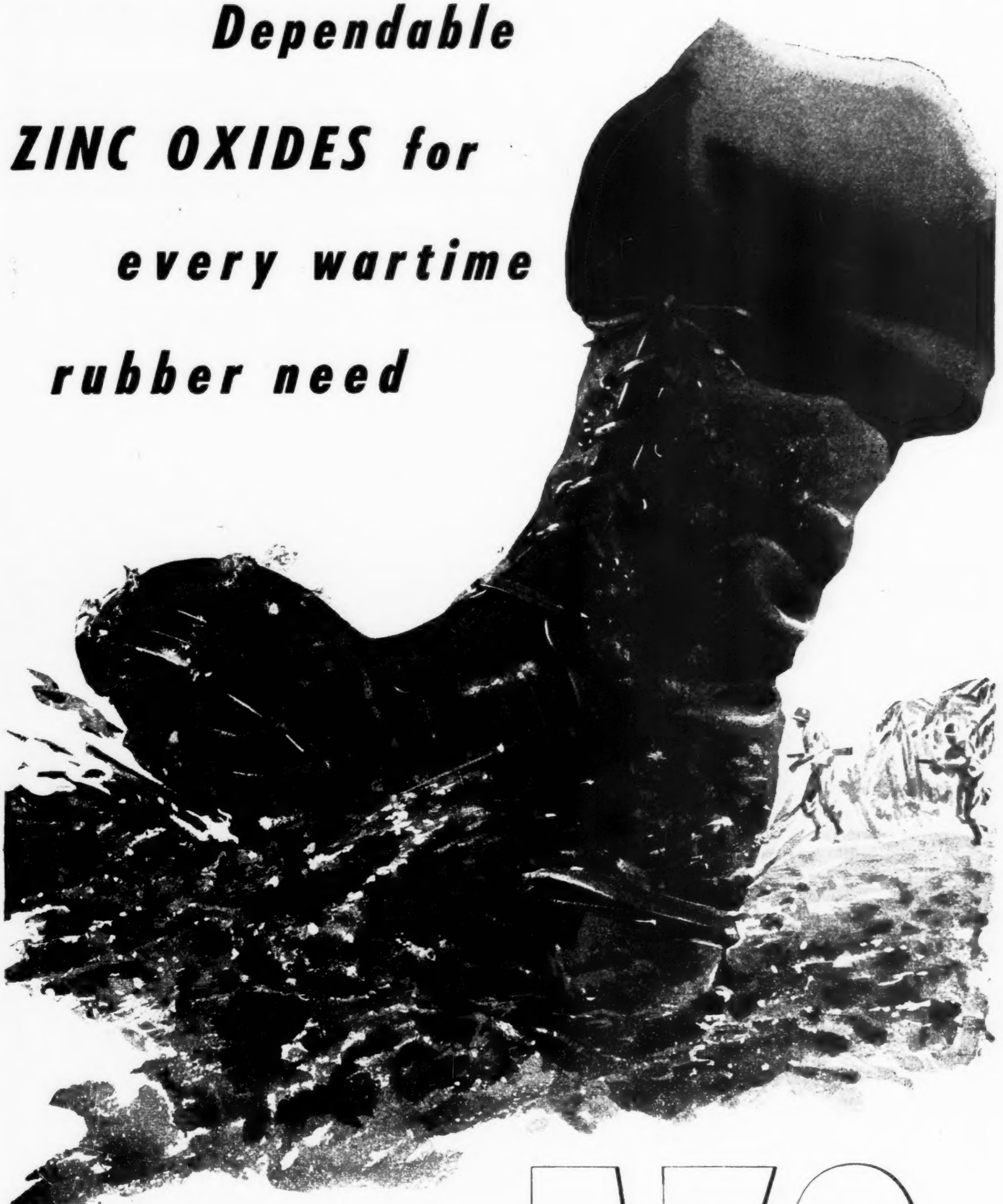

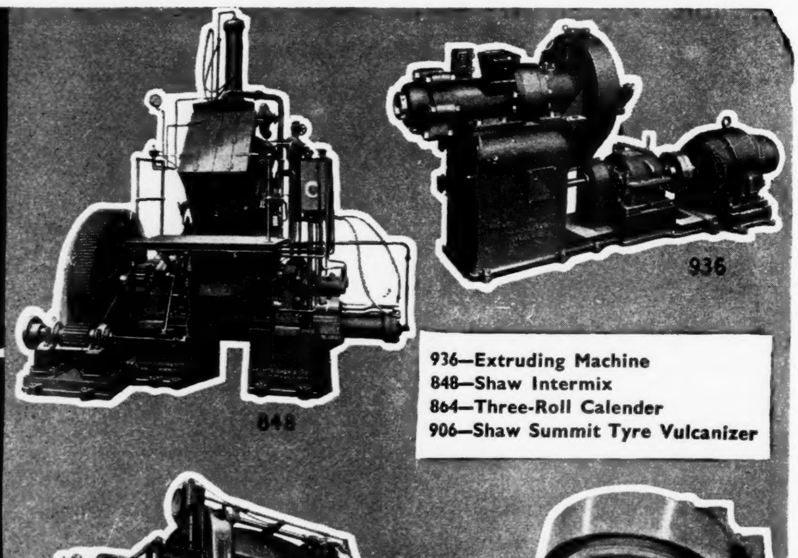

936—Extruding Machine
848—Shaw Intermix
864—Three-Roll Calender
906—Shaw Summit Tyre Vulcanizer

February, 1945

Volume 111 Number 5

A Bill Brothers Publication

INDIA
RUBBER WORLD
NATURAL & SYNTHETIC

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Published monthly by Bill Brothers Publishing Corp., 386 Fourth Ave., New York 16, N. Y. Chairman of Board and Treasurer, Raymond Bill; President and General Manager, Edward Lyman Bill; Vice Presidents, Randolph Brown, B. Brittain Wilson.

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Subscription price—United States and Mexico, $3.00 per year; all other countries, $4.00. Single copies, thirty-five cents. Other Bill publications are: GROCER-GRAPHIC, PREMIUM PRACTICE, RUG PROFITS, Soda FOUNTAIN SERVICE, TIRES Service Station, Sales Management.

INDIA

RUBBER WORLD

NATURAL & SYNTHETIC

Published at 386 Fourth Avenue, New York 16, N. Y.

Volume 111 | New York, February, 1945 | Number 5

Raw Material Outlook in the Rubber Industry

John L. Collyer[1]

The Author

FOR the first time in its history the rubber industry in this country is using as its primary raw material a commodity other than natural rubber. The announcement late last year that production of the nation's war-born synthetic rubber industry had reached an annual rate of 800,000 tons was tremendously significant. Even in 1941, the record prewar year, consumption of rubber, all types, in the United States was less than that. This means that the output of man-made rubber is now greater than were the imports of natural rubber at their peak.

The swift success of our wartime synthetic rubber program has erased the biggest question mark that has faced any American industry in this war. We know now that what the Japanese hoped for when they captured the rubber lands in the Far East—the breakdown of the American rubber goods manufacturing industry for lack of raw material—will not take place. It will not happen in this war, and it need not occur in the future—provided that a suitable portion of the nation's present synthetic rubber production facilities is retained after the Far East rubber lands are restored.

If the vital importance of the rubber industry to the nation needed any emphasis, that has been provided in the fact that after each of the two major military setbacks of this war—Pearl Harbor and the recent enemy offensive in Europe—it was rubber that was spotlighted as the nation's chief industrial emergency. But, thanks to the synthetic rubber program, the problem now is not the availability of raw material, but how, with the manpower and manufacturing plants obtainable, to build the material into sufficient war goods to meet the enormous requirements of the drive for victory in Europe and in the Pacific.

This new problem is no easy one. But its solution depends upon hard work and ingenuity, and these are not unfamiliar factors in the rubber industry. This problem does not require, as the former crisis did, the creation of a new industry and the conversion of manufacturing formulae and processes to a new type of raw material differing greatly from its predecessor in important characteristics.

We are winning a war that could have been lost had we failed to win the battle of synthetic rubber. Our nation's success in rearing up this huge array of facilities, and making the product perform satisfactorily, has implications for the future that may eventually equal in importance its wartime significance.

The Broadening Field of Synthetic Elastomers

Synthetic rubber, important as it is, represents by no means the entire contribution being made to the prosecution of the war with new materials brought to light in the research laboratories of the rubber industry.

The 1,750-ton total of synthetic rubber which was produced in 1939 was composed entirely of special-purpose varieties. These had proved their worth in American industrial life before the war. They had proved that because of such qualities as superior resistance to oils and acids and alkalies they were better than rubber for certain special uses. The market for these special-purpose synthetic rubbers, and for plastics serving comparable fields, has grown substantially during the war and promises to broaden to an even greater extent in the future.

Furthermore through the development of synthetic elastomers, both thermosetting and thermoplastic, that bridge the gap between elastic vulcanized rubber and the rigid plastics, the industry has provided some of war production's most important and useful materials and has tremendously broadened the scope of the industry and its postwar possibilities.

Not the least of the wartime benefits of these new materials is the relief they have afforded to the strain upon the stockpile of natural rubber which has nevertheless dwindled from a peak of more than 600,000 tons following Pearl Harbor to a point

[1] President, B. F. Goodrich Co., Akron, O.

where we can say that we are and have been for some time scraping the bottom of the barrel.

Substitution of reclaimed rubber and plastics have helped. For example, practically all of our company's output since Pearl Harbor of the synthetic elastomers made possible by the discovery of the art of plasticizing vinyl chloride polymers has gone into war production. Their principal application has been in providing superior heat and flame-resistant insulation for cables and wiring in naval vessels of all types and in planes and tanks, where they are greatly reducing fire hazards.

These special-purpose synthetics and plastics will be even more versatile in peacetime production than they are in filling the needs of war. They will help keep the rubber industry in step with the expanding economy that must follow the war if the goal of full employment is to be attained. Such an economy calls for the broadening of markets through the creation of new, better, or lower-cost products. Fundamental to the creation of such products and therefore to the broadening of markets are low-cost raw materials that because of extraordinary performance are low-cost in effect.

Relations between Rubber and Plastics Industries

The wartime dependence on synthetic rubber, as one of the Allied nations' major volume materials, has focused attention on the relation between the rubber and the plastics industries. Of course the truth is that natural rubber always has been just as much a plastic material as any of the synthetic rubbers. Long before the word "plastic" was ever used commercially as a noun, we employed rubber to manufacture pocket combs, telephone receivers, and other items of that kind. In that respect the rubber industry always has been in the plastics business.

Today the rubber industry is interested in any kind of material that will improve its products or reduce their cost without impairing their quality. I do not believe that any promising new material that might appear on the industrial horizon today would get the sort of reception that the industry accorded Bakelite, for example, when it came on the scene back in 1908. Instead of sponsoring that promising new plastic, the rubber industry regarded it as an unwelcome interloper and persisted in fighting against it for years though it had unquestioned advantages over hard rubber for some uses. For instance, those long, black boxes, with three heavy dial-knobs, that featured the first home radio receiving sets in the early '20's provided a sizable business in the sale of hard rubber, in sheet form for the panels and in molded form for the knobs. But Bakelite was able to come in and take practically all of that business away from the rubber people because, although the material itself was of higher cost, it had certain definite advantages in the amount of manufacturing time needed and in appearance.

Of course hindsight is always better than foresight; and the above is not mentioned for the purpose of finding fault with earlier leaders in the industry, whose genius and devotion had so much to do with its amazing growth. It shows, however, that the industry's attitude with respect to new materials has changed, and a change in attitude can be as significant in its way as a change in raw materials.

Nowadays rubber manufacturers are abundantly aware that rubber is a plastic. Most of us are in the plastics business more or less directly with some non-rubber or semi-rubber products, such as the synthetic elastomers which have been mentioned.

Speaking for B. F. Goodrich at least, we no longer have any fixed ideas that any one commodity is the best for use in our many products. We know that the field is wide open, for example, as between natural rubber and synthetic rubber, and the choice will go in any given case to whichever one proves to be the soundest economically.

In the past the basic task of the rubber industry, the task underlying its manufacturing function, has been to find applications for natural rubber in the production of useful products. But now this underlying purpose has come to be something different. The task now is to provide, through special compounds, materials tailored to the requirements of a vastly greater variety of specific products.

Natural vs. Synthetic Rubbers

There is no reason at this time to doubt that natural rubber, when it again becomes available on a large scale, will be a basic ingredient in many of these products. But experience has confirmed the belief that after the war natural and synthetic rubbers will be in competition over a wide field. In the prospect of this competition lies a promise of better and lower-cost goods for the American consumer.

The average cost of all of the main-type synthetic rubber made to date is approximately 32¢ a pound. In certain plants, however, this type of synthetic rubber has been made at a cost of 14¢ a pound, exclusive of amortization and depreciation of plant. The last prewar market price of natural rubber from the Far East was approximately 22¢ a pound.

But it would be a mistake to suppose that synthetic rubber has already gained an economic advantage over natural rubber under normal conditions. Regardless of the price charged, the Far Eastern plantations could, as we already know, have laid down rubber in New York at 10 to 12¢ a pound and still have made a reasonable profit.

The 14¢ cost of synthetic rubber—which, it must be borne in mind, has been realized only in certain plants—does not allow for any profit, and without a profit venture capital could not be attracted to the synthetic rubber industry. If we add to that cost 1¢ for amortization, another for storage and distribution charges, and then allow for a reasonable profit, the cost would be up around 20¢. And a comparison of the cost per pound does not tell the whole story, as the differences in processing costs and in finished product performance between the two materials must also be considered. Technical progress will likely keep this picture changing.

What is clear even now, is the fact that America's synthetic rubber performance has provided an effective ceiling over raw rubber costs, and this has an important bearing upon the postwar production of more and better products which will lead to wider markets and more jobs.

Also important is the increased world output of raw rubber that is possible after the Far Eastern plantations are restored to normal production. In 1941 those plantations produced for a few months at the rate of 1,600,000 tons a year. Our company estimates the world's capacity for producing synthetic rubber at 1,200,000 tons. This shows a potential world rubber supply of 2,800,000 tons a year, and this is more than twice as much as the world ever used in any one year.

Nothing like prewar quantities of natural rubber can be expected immediately after the Far Eastern plantations are recaptured. It will take time. Our estimates indicate that about 480,000 tons of rubber will be made available by the Far Eastern plantations the first year after their liberation. As synthetic rubber production for the same period will probably be in the neighborhood of 1,000,000 tons, nearly 1,500,000 tons of rubber, natural and man-made would be available, and it should all be consumed.

In the following year the second year after the liberation of the rubber plantations, it is estimated that 1,100,000 tons of natural rubber will be available. The estimated consumption in that year is 1,600,000 tons so that minimum requirements of synthetic and special-purpose rubbers would be only about 500,000 tons. It is during that period that the combined potential production of natural and synthetic rubber would begin to exceed the demand, and that competition normally should develop between natural and synthetic rubbers over a wide field.

Just what the eventual "balance of power" between natural and synthetic rubbers will be is impossible to foresee. Two of the biggest of the many "unknowns" that prevent such a prediction are the relative production costs and relative usefulness of the two kinds of material two or three years from now. For tires and most other big-volume uses natural rubber is still the better material. It is easier to work with and more reliable in performance and would command a premium over synthetic if both were on the market. But we in this country have learned to expect amazing developments in connection with synthetic materials, and no one would ever want to guess that the situation will not be substantially altered within three years from now.

Regardless of questions of cost or superiority, the nation should keep up a minimum production of 200,000 tons a year of synthetic rubber for reasons of national security. Thus we could be assured of this vital defense material no matter what plots or raids an enemy force might carry out.

Drug Sundries[1]

W. J. O'Brien, Jr.[2]

As THE words drug sundries imply, this business comprises many and sundry kinds of rubber articles related in some way with hospital and drug supply. These rubber articles can be either hard or soft, made from crude, reclaimed, or synthetic rubber, or latex, natural or synthetic. In many cases plastics have entered the picture, and today nearly all types of curing, pressing, and extruding of the various synthetic elastomers are employed.

History of the Industry

The historical development of this very interesting industry with its multiplicity of products and problems merits our attention. Lost in antiquity is the first use of rubber as a water container, but water bottles of gum rubber were used by South American Indian tribes prior to European exploration. These containers, of course, were made of uncured rubber. It was not until about 1845 that Hancock in England and Goodyear in America made a cured rubber water container capable of holding hot water. This was the first rubber hot water bag or bottle. This bottle was fabricated by hand and backed by fabric for extra strength. This method of manufacture has continued up to the present time.

The leading producers in England are Reliance, Warren, Dunlop, and Franklin Bros., of London; in Germany, Continental Rubber, of Hanover, which has been bombed; in Italy, Pirelli; in Austria, Semperit; and in France, Croix de Lorraine.

One of the earliest drug sundry items produced in quantity was the nursing nipple manufactured in 1877 in Union City, Conn., near Naugatuck. This was the first seamless rubber nipple produced from rubber cement, then either steam or cold cured. Previous to this date nipples had been made in small quantity from calendered stock, the two dried-out halves seamed in the center. During the present century pure gum press-cured molded nipples and nipples dipped from liquid latex have largely displaced the cement nipple.

By 1885 hand-made water bottles were being produced in quantity in this country, and this brought in turn the manufacture of water bottle tubing, bulbs, and hard rubber pipes and combs. About 1900 the rubber glove field underwent sharp development starting with fleece-lined black gloves for motormen, and later surgeons' gloves dipped from fine Para cement and cold cured were added. Bands, dental dam, bandages, adhesive tapes and plasters of various kinds followed. Many other items for the sick room were, of course, manufactured: crutch tips, head and abdominal coils, operating cushions, pads, and various special surgical rubber supports and aids. These developments were followed by athletic goods such as bladders, baseball centers, hand and squash balls, baseball plates, hockey pucks, etc. Still later plastics entered the picture, and Bakelite, cellulose nitrate, acetate, ethyl cellulose, acetobutyrate, and styrene were compression and injection molded. Before the present war with the bathing line of caps and suits and the rainwear line, a large drug sundry house had approximately 3,000 items catalogued for sale.

Some General Considerations

The various kinds of products that a drug sundry house makes carries the investigator into many types of stocks and involves nearly all methods of cure. At present none of the synthetic rubbers cold cure in so satisfactory a manner as does natural rubber.

The drug sundry business is in reality a group of small specialty units all based on style. By that we mean the "feel" of the goods, and the "hand" of them is of importance. Appear-

American Cloth-Inserted Hot Water Bottle

English-Style Hot Water Bottle

ance is of paramount interest. Color, shape, and finish of the goods is a great factor. There should be no objectionable odor nor disagreeable taste. Many drug sundry articles must stand great abuse, such as water bottles, surgeons' gloves, and drainage tubing, which are repeatedly sterilized with steam under pressure; bulbs and colon tubes must stand oils and greases.

Bright, cheerful colors which will brighten the sick room and make for cleanliness are desired. In most cases the article is or was pure gum or contained some light colored pigment. This precludes the use of carbon black in any form with its excellent tensile, tear, and heat resistance; so in every case, where possible, heavy antioxidant load is used with due care to avoid as far as possible discoloration and skin irritation.

Essentially, then, the rubber technology of drug sundries is one of pure gum compounding or white pigment compounding with occasional excursions into the realm of the carbon blacks. Incidentally the resistance, sales and otherwise, to black goods in our industry is very real.

Every business has a line of goods that is its backbone, and in drug sundries water bottles, or as we know them "flat goods," are the backbone here. This line includes, besides water bottles, fountain bags and ice caps. These are, of course, made in a wide variety of sizes and shapes.

Hot Water Bottles

Since the first requirement of a water bottle is to hold water, it must not leak or absorb water excessively, or swell or rupture easily while hot. Up to the time of Pearl Harbor we used little or no reclaim in water bottles. Reclaim was avoided for several reasons: in the first place clean bright colors were impossible where it was used, and, secondly, the water absorption with accompanying swelling is greatly increased. The figures given in Table 1 illustrate this difference in swelling for both natural and synthetic rubber when reclaimed rubber is used.

TABLE 1. % SWELL AFTER SIX DAYS' BOILING

Rubber water bottle	5%
75 rubber, 25 reclaimed water bottle	25%
Buna water bottle	7%
75 Buna, 25 reclaimed water bottle	30%

The tensile strength, of course, is also decreased with increased reclaim. Whether backed by fabric, as in a hand-made bottle or molded on a core, a water bottle stock should be "rubbery" in nature so as to conform closely to the contour of the body. The advent of the molded bottle dates from about 1905. Fountain syringes were molded first, using a core which was extracted through the neck after cooling. Later on water bottles were made in the same manner. One company extracts the core from the base of the bottle, since less strain is involved by this operation. In any case the bottle must be closed either at the neck or at the base where a cemented and cured closure is used.

[1] Presented before E.S.M.W.T. Rubber Technology Section, Feb. 16, 1944, at Yale University and rewritten for INDIA RUBBER WORLD.
[2] With Seamless Rubber Co., New Haven, Conn.

"Compacto" Fountain Syringe

Household Gloves with Reenforcing Patches

"Colpac" Latex Ice Cap

Formulation

The formulation of a water bottle or in fact any other article of this type never presented a real problem as long as rubber was available. But with Pearl Harbor and reclaim and now with Buna S our efforts to make pure gum stocks and white filled stocks were repeatedly defeated or blunted because what we were attempting was in direct conflict with the physical properties of these materials. A pure gum Buna S stock has only about a 500-pound tensile, and it cannot be substituted for a pure gum crepe rubber molded nipple stock of 3000 pounds tensile. In the same way a 2500-pound water bottle stock made from rubber will fabricate better than a Buna S bottle stock of one-half to two-thirds its tensile. Even all this would not be so bad if Buna S behaved at high temperatures like natural rubber, which unfortunately, it does not. (See data in Table 2.)

TABLE 2
Room Temperature *vs.* 210° F.

	Natural Rubber Water Bottle % Drop	GR-S Water Bottle % Drop
Tear	5	50
Tensile	25	55
Elongation	30	40

At molding temperatures the conditions are even worse. Since admittedly we cannot do much about pure gum Buna S, for probably here a polymer change is the only solution—we will turn our attention to what can be done with white pigments in compounded GR-S, for only through higher tensiles is better tear performance possible. Let us examine a rubber water bottle formula and compare it with a GR-S water bottle formula (Table 3).

TABLE 3

Compound A		Compound B	
Rubber	100.	GR-S (Naugatuck)	100.
Whiting	95.	Fine particle whiting	100.
Sulphur	2.1	Sulphur	4.
Mineral oil	1.0	Softener	5.
Benzothiazyl disulphide	1.1	Para Coumarone Indene Resin	20.
D.O.T.G.	.15	Mercaptobenzothiazole	2.5
Zinc oxide	8.0	D.O.T.G.	.3
Antioxidant	2.0	Zinc oxide	5.
Color	2.0	Color	2.0

We can say that first of all the rubber in Compound A has been broken down with RPA No. 2, no peptizer was used in GR-S since currently available peptizers either disclor the product or cause it to have considerable odor. A non-discoloring, non-toxic odorless peptizer is needed. We can see also that more softener is used, more acceleration, and finally a fine-particle-size pigment is incorporated in Compound B. These three components, *softener, acceleration,* and *filler,* determine the physical properties, but there is yet another very important factor that we cannot overlook: namely, dispersion. Dispersion is all important in determining what the final tensile will be, also how the stock will process. Control of dispersion hinges on no one element, but is a composite problem. The standard laboratory mill can play tricks of dispersion with Buna S more than with rubber. Since fine-particle-size pigments do not wet easily, too close a roll opening, i.e., 0.025-inch or under, should not be used as the bank on the laboratory mill cannot revolve unless the load is very small, and with a large bank excessive softening results. An opening of about 0.050-inch for mixing followed by a refining with tight rolls seems best. Too large an opening may cause a severe undercured condition due to lack of sulphur dispersion. It is important that a reasonably constant mill roll setting be maintained so that comparative tests can be obtained.

If we examine our three components: namely, *softener, acceleration,* and *filler,* we find that the choice of softener, besides affecting tensile, also affects dispersion. If we list some of the softeners, we find very few that do not affect tensile adversely, do not discolor, have little or no odor, are non-toxic, and are compatible. (See Table 4.) It is unfortunate that the best softeners and tensile builders mostly all discolor.

TABLE 4

Compound Formula	
Buna S	100.
Sulphur	4.
Zinc oxide	5.
Color	1.5
Mercaptobenzothiazole	2.5
D.O.T.G.	.3
Softener	25.
Fine particle whiting	100.
Cure 5′ @ 50 lbs.	

Softeners	Tensile P.S.I.	Elongation %
Cumar RS	1225	600
Cumar MH 2½	1800	675
Cyclene oil	685	525
Rosin oil	980	762
Wax-Montan	1140	575
Petrex	1300	575
Reogen	725	550
Naftolen	910	500
Tarzac	910	550
Plasticizer B	1025	625
Dicapryl Phthalate	730	525

We see here that Cumar MH 2½ is outstanding among the softeners tested. In general ester-type softeners are not of great value. Tensiles are up where resin types softeners are used, and these materials seem to act as a sort of wetting agent as well as softener. Such materials in the order of their relative effectiveness are: Cumar MH 2½, Turgum, Galex, Staybelite, and Piccolyte. There are many other materials of this type but most of our work has been with those mentioned above. Where tubing is a factor, vegetable oils such as palm oil or cottonseed smooth out the stock; wool fats can also be used, but all these items deteriorate tensile rapidly.

Acceleration in non-black stocks follows the same trend as in black stocks except that, of course, discoloring accelerations cannot be used. In general the thiazoles, guanidines, and similar types or combinations work out well especially for short cures.

At this point we might ask ourselves: Does the choice of acceleration or softener or both affect elongation and tensile during the heat aging of Buna S white pigment goods? Certainly some reversion is desirable for there is proof that during room temperature aging, elongations drop and tensiles rise; therefore it is desirable to hold this shortening of elongation to a minimum. The deteriorating Buna S stock does not pass through a soft reverted rubber phase, but goes rapidly to a stiff boardy state. One test which shows interesting possibilities was conducted as follows.

TABLE 5

	Original		Capacity in Ounces after			Aged	
Bottle	Tensile P.S.I.	Elongation %	72 Hrs.	120 Hrs.	180 Hrs.	Tensile P.S.I.	Elongation %
A	1500	650	64	60	60	840	210
B	1500	645	64	60	64	1350	450

Bottle A		Bottle B	
Mercaptobenzothiazole	2.5	D.O.T.G.	2.5
D.O.T.G.	.3	Mercaptobenzothiazole	.3

If we pass live steam through bottles A and B for 180 hours and measure their capacity in ounces at 72, 120, and 180 hours and take tensiles after 180 hours, we find by a simple accelerator exchange that Bottle B in Table 5 is a reverting bottle with many of the characteristics of rubber. It is a better bottle than A, but is darker owing to accelerator discoloration. What

is needed is a non-discoloring reverting acceleration. If 10 parts of Naftolen or Bardol or some other softener are added, the elongation in both bottles is higher after aging, but B is still superior.

The choice of filler rests on the product to be made. The filler should incorporate readily, be non-gritty, give good tensile with fairly low set, be non-discoloring, and possess low water absorption. If we take *Compound B,* our GR-S water bottle compound, and run a series of fillers, we find the following relation given in Table 6 to exist:

TABLE 6

	Tensile P.S.I.	Elongation %
Coated fine particle whiting	1700	600
Uncoated fine particle whiting	1650	575
Zinc oxide	1640	610
Clay	1610	585
Iron oxide	1320	560
Super floss	890	450
Coated whiting	880	610

There are other fine-particle-size pigments not in this test—in general all are inferior to coated fine particle-whiting for tensile as well as for ease of incorporation not only for the main pigment, but where some clay is used, coated fine particle whiting aids its incorporation. Usually clays have a high permanent set.

As to pigment load, equal parts pigment and hydrocarbon GR-S is a good starting point—the higher the load above this point the harder the mixing and dispersion, and if high set is a property of the pigment, this becomes very noticeable the higher the load.

The retarding of cure is not always due to the pigment, but may be due to a peculiar property some pigments have of "breaking down" the nerve of the GR-S mix on further mastication.

Neoprene Compounds

I have stressed GR-S compounding since this is the big-volume government rubber. But of no less importance are the other synthetics—and of these neoprene is outstanding. The largest single use for neoprene in drug sundries is blown goods represented by atomizer bulbs of all kinds. Since they are often in contact with oil, neoprene makes an excellent article. A formula for such a bulb is shown in Table 7.

TABLE 7

Neoprene GN	100.
Zinc oxide	10.
Stearic acid	3.
Dibutyl phthalate	9.
Calcene	10.
Clay	10.
Light calcined magnesia	5.

Neoprene is also used in sheet goods and for inflatable goods of all kinds; it does freeze in the uncured state at room temperature, but this deficiency cannot be entirely eliminated by softeners.

Hard Rubber Goods

Hard rubber goods in drug sundries are usually restricted to pipes, fittings, and combs. Buna N is ideal for hard rubber work, but Buna S can be used and makes a good molded product. In general Buna N hard rubber has a higher melting or softening point than a Buna S hard rubber; the former also has an excellent black color and takes a fine polish. Representative formulae are given in Table 8.

TABLE 8

Buna N Compound		Buna S Compound	
Buna N	100.	Buna S	100.
Sulphur	35.	Sulphur	35.
Accelerator	2.	Accelerator	1.
E.P.C. black	50.	E.P.C. black	40.
Dipolymer oil	20.	Hydrogenated rosin	25.
Zinc stearate	2.	Hard rubber dust	75.

Cure 45' @ 70 lbs.—thin section

Both hard rubbers have good resilience, resist shatter, and age well. Buna S hard rubber dust should contain more than 35% sulphur on 100 of hydrocarbon or else retarding of the cure will be severe when sizable amounts of dust are used. This characteristic is true of GR-S dust, but not of regular rubber dust. Soft and variable cures are more liable to occur with Buna S hard rubber products than with rubber, and this condition is due not only to a more difficult sulphur dispersion problem, but to breakdown, a variation of the polymer itself—if the compound is excessively milled.

Adhesive Tape

Pressure sensitive surgical adhesive tape has for years had Fine Para rubber as its base. No satisfactory surgical adhesive has been made from reclaim though good industrial pressure-sensitive masses have been and are still being produced. Following Pearl Harbor, polyisobutylene became the industry's surgical adhesive base. Adhesives made from this base, while satisfactory, possess only fair internal strength, which adversely affects adhesive and cohesive tack. Synthetic pressure-sensitive masses perform better on paper and cellophane than on woven fabric because of their greater tendency to cold flow.

Latex Technology

In closing, a word can be said about liquid rubber technology. Buna S latex has not as yet proved acceptable for the manufacture of surgeons' gloves. The best tensiles are about 1,000 pounds in the pure gum state; while those of natural rubber latex run better than 5,000 pounds with elongations of 900%. The formula of such a compound is given, in Table 9, as well as a neoprene latex Type 60 compound whose tensile is about 3,000 pounds and whose elongation is 950%.

TABLE 9

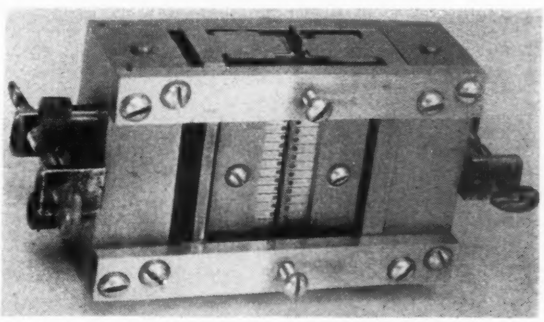
Rubber Surgeons' Glove		Neoprene Surgeons' Glove	
Rubber	100.	Neoprene latex type 60	100.
Sulphur	2.	Zinc oxide	5.
Zinc oxide	.75	Antioxidant	2.0
Accelerator	1.1	Accelerator	1.5
Antioxidant	.75	Oil	3.0

The tensile will vary with the age of the raw neoprene as well as the compounded material. The sterilization life of such a glove is excellent though its curing time is longer and its water absorption is higher than a comparable rubber glove. Efforts to reduce the water absorption lead to lower tensiles.

Thermosetting vinyl butyral in dispersed form is a mild possibility—the tensile in the dry state of 3,000 pounds falls to about 800 pounds in the dried dispersed form; coagulated films are consequently not too strong. It is possible, however, that from such combinations of, say, butadiene, the vinyls, and possibly styrene, a new pure gum synthetic may arise which will have high tensile and be non-toxic as well as suitable for dipping. The drug sundry industry can use such a product.

Compression Test Jig

THE direct determination of compression yield strength of a single sheet of material is speeded and facilitated by a new jig having a number of small rollers which restrain the sheet from lateral deflection. Extensometers are attached to the edge of the sheet. The jig considerably simplifies compression testing of sheet material such as rubber and is an inexpensive piece of laboratory equipment. Baldwin Southwark Division, Baldwin Locomotive Works, Philadelphia, Pa.



Sheet Material Compression Testing Jig

Recent Russian Literature on Natural and Synthetic Rubber—XIII

M. Hoseh

CHANGE in Plasticity of SK as Affected by Fillers. N. A. Chesnokov, "Kauchuk i Rezina," 11, 11-13 (1939). **S-35.**

The purpose of this investigation was to study the effect of powdered filler on the plasticity of SK. The investigated powders were talc, chalk, precipitated $CaCO_3$, kaolin, ZnO, lithopone, lampblack, $MgCO_3$, MgO, and gas black. These powdered substances were added in quantities of 5, 10, 20, 30, 40, and 50% by volume each. The experiments were made with two kinds of SK, one having a plasticity of 0.49, and the other 0.31. The plasticity of the mixtures was determined on a modified Williams plastometer. The results are tabulated. Most of the powders, when added in quantities of less than 30%, had little effect on the SK. None of the tested fillers raised the plasticity of the SK samples. With the exception of gas black and MgO the fillers lowered the plasticity of SK having an original plasticity of 0.49, when they were added in excess of 30% by volume. In the case of the less plastic SK (0.31) lithophone, MgO, $MgCO_3$ and both kinds of carbon black lowered the plasticity even when added in quantities less than 30% by volume. Generally, the tested fillers can be divided into three groups: (1) those that have little effect on SK—talc and chalk; (2) those that lower the plasticity of SK considerably—both kinds of carbon black, MgO, and $MgCO_3$; and (3) those whose effect on SK is moderate—in this group belong all the other tested fillers.

Aging of Rubber. I. U. Mishustin, "Kauchuk i Rezina," 11, 14-21 (1939). **S-36.**

The purpose of this investigation was to study (1) the effect of physical age resisters (plasticizers) on rubber, (2) the effect of diminishing of S content on aging; (3) the effect of chemical age resisters; and (4) aging of rubber by various methods. Twenty-two physical and 18 chemical age resisters were studied. These were tried both in black and colored rubber. The rubber recipes were made with SK. The most effective physical antioxidants for black rubber were: ozocerite, ceresin, stearic acid, pine tar, and Rubrax; they acted not only as age resisters, but improved the mechanical properties of the rubber as well. Most effective chemical antioxidants for black rubber were: anthranilic acid, Neozone, Stabilite, AgeRite, and the reaction product of naphthylamine with glucose. Best results were obtained when both physical and chemical age resisters were used jointly. For colored rubber the best physical antioxidants were: ceresin, vaseline, paraffin, and colophony. The best chemical age resister proved to be tetraphenylhydrazine. Good age resisting results for black rubber are obtained by lowering the quantity of S and using a normal amount of the accelerator. For colored rubber good results are obtained by lowering the S content and raising the accelerator content.

Aging tests carried out by different methods give different results. For the investigated age resisters the indices obtained by natural aging (six months in open air) were higher than those obtained by the Geer method. Most reliable method for testing aging is the natural method because it approaches closest the conditions to which rubber is exposed in actual use. The preferred accelerated aging method is to expose the rubber under a quartz lamp to the action of ultra-violet light. By the natural aging method the tested specimen is exposed to the action of heat, light, oxygen, ozone, and moisture. Under a quartz lamp the specimen is acted upon by all of the aforementioned factors except moisture; while by the Geer method the tested specimen is exposed only to heat.

Industrial Significance of "Eucommia Ulmoides." G. R. Stepanov, "Kauchuk i Rezina," 11, 22-23 (1939). **N-22.**

Experimental work started in 1931 enables now the evaluation of the importance of *Eucommia ulmoides* as a rubber bearing plant. In this plant the rubber is distributed in the bark of roots and shoots and to a smaller extent in the leaves. Over a period of six years one hectare (2.471 acres) yielded 600 kilograms (1322.8 pounds) of rubber, or an average of 100 kilograms per hectare per year (88.2 pounds per acre per year). By improving the methods of cultivation, the yield can be easily increased three-five times. Decortication by hand is too time consuming. Suitable machinery must be devised to handle this phase of work. The immediate problems facing the *Eucommia* growing industry are: a change from experimental raising of this plant to large-scale cultivation; production of suitable decortication equipment; and improved methods of extraction and processing of the rubber and the resinous substances that accompany it.

Dichlorethane as a Solvent. V. N. Provorov, "Kauchuk i Rezina", 11, 24-27 (1939). **SN-54.**

A study was made of the properties of dichlorethane as solvent for rubber. It was compared with benzene, and the following are the results of the comparison:

Time	Temp. ° C.	Rubber Dissolved in Grams per Liter of Solvent	
		Benzene	Dichlorethane
15 min.	55	45	78
30 min.	11	55	102
60 min.	11	68	107
60 min.	18	39	77
3 hours	18	68	134
24 hours	18	116	144

The change of acidity of dichlorethylene-water mixtures was studied with reference to relative amounts of the two in the mixture, its temperature, and time of action. Both chemically pure and technical dichlorethylene were studied. Increased amounts of water (1-50%), longer time of standing (0-72 hours), and higher temperature (55° C. to boiling) all caused an increase in acidity. The effect of these factors was greater for the technical grade than for chemically pure dichlorethylene. Because of the acidity of dichlorethylene it is conceivable that it may corrode chemical equipment. The corrosive action of dichlorethylene was tried on iron, tin

plate, galvanized iron and copper. The samples were kept in boiling dichlorethylene for six and 180 hours. The corrosive effect was not very serious except for tin plate. 98.5% pure aluminum under similar condition was corroded insignificantly. Danger of corrosion exists if water is present. The effect of time on dichlorethylene was studied in light and in the dark. Dichlorethylene ages more rapidly when left in light than when kept out of it. Although its specific gravity does not change, its acidity increases. After 142 days the acidity of dichlorethylene kept in light increased sevenfold; while the acidi y of a sample kept out of it increased only 1.9 times. Redistillation lowers the acidity of dichlorethylene. Similar results can be obtained by the utilization of soda.

Reducing the Time of Vulcanization and Improving the Quality of Molded Galoshes. N. S. Il'in, I. A. Shokhin, and N. A. Ravdo, "Kauchuk i Rezina", 11, 39-41 (1939). **SN-55.**

In the hitherto practiced procedure galoshes had to be vulcanized for 10-12 minutes. Any reduction of this time requirement, even if compensated for by an increased quantity of accelerator, resulted in a sharp increase of rejects. On the other hand an increase in temperature to shorten the time requirement caused scorching of the outside surface. Thermocouples were placed in various places of the inside to determine the temperature lag. The accelerator used was thiuram, which becomes active at temperatures above 130° C. At a molding temperature of 151° C. the inside attained a temperature of over 130° C. only after nine minutes. At a total vulcanization time of 12 minutes the inside was not vulcanized for more than approximately three minutes. It was necessary, therefore, to find an accelerator which would become active at lower temperatures and which would give maximum results in less time. It should be remembered that accelerators which become active at too low temperatures might be equally unsuitable since the mix is calendered at 80-100° C. K-45, however, satisfied both of these requirements. It becomes active at 120° C. and requires only approximately three minutes to complete vulcanization. This temperature is attained inside the galoshes within three minutes. It follows that vulcanization can be completed after six minutes. This change not only cut down on rejects, but raised production by 30-40%.

Consideration of Local Raw Materials for the Rubber Industry. I. N. Byvshev, "Kauchuk i Rezina", 11, 42-45 (1939). **M-21.**

A number of substances, as diatomite, mineral carbon black, shale tar, peat tar, dust from the leather industry, lake chalk, marshalite, magnesite, anhydrite, etc., are suggested as possible substitutes for commonly used fillers, plasticizers, and extenders. Many of the suggested substitutes have been found equal to or even better than similar substances now in use. Others did not equal present fillers, etc., but these materials may be adaptable. The substances suggested as substitutes are available in enormous quantities and quite often found near rubber producing plants. Those which have proved successful should be utilized now, and others should be further studied, the article states.

Painting Toys with Rubber Glue. G. I. Dubrovin, "Kauchuk i Rezina", 11, 47-48 (1939). **SN-56.**

For painting toys are used ordinarly oil paints, which require drying oils that are scarce; their drying time is excessive, and they age quickly and crack. Experiments were made on decorating toys with rubber adhesive to which is admixed lithopone, kaolin, magnesia, carbon black, etc. An antioxidant is always used with it. The results were very satisfactory.

Problems of Vulcanization and the Effect of Fillers on Butadiene Rubber. B. A. Dogadkin and M. S. Fel'dshtein, "Kauchuk i Rezina", 12, 12-18 (1939). **S-37.**

The most characteristic phenomenon accompanying vulcanization is the insolubility of the vulcanized product in common solvents and an increase in its strength. Phenomena closely resembling vulcanization are brought about not only by sulphur. It is known that the transformation of the soluble state into an insoluble one is effected by certain organic nitrogenous compounds, organic peroxides, polyhalides, and others. Light and heat may give similar results. The effects of so-called cold vulcanization are more frequent in synthetic rubbers than in natural rubber. In vulcanization the fillers incorporated into the recipe play a considerable role. The filler may be involved in one or more of the following reactions: (a) surface reactions in the rubber-filler structure; (b) interaction between the rubber and the gases absorbed by the filler; and (c) catalytic action of the filler upon the condensation of the rubber hydrocarbon.

In connection with this aspect the authors have studied the effect of lampblack, chalk, kaolin, activated silica, and temperature (70-200° C.) on butadiene rubber. All of these substances when mixed with butadiene rubber in certain proportion, reduced appreciably the swelling of the mixture in common solvents. The minimum quantity of the filler required to reduce swelling is referred to as optimum filling. Its value was different for various fillers, e.g., for lampblack 55-65%, and for chalk 150-200%. The reduced swelling the authors explain by the structure of the mix. Until the optimum filling is reached, the SK forms the continuous phase and the filler the dispersed phase. When the optimum filling is attained, the filler becomes the continuous phase, forming a framework, while the SK is the discontinuous phase dispersed throughout this framework. Heating the SK-filler mixtures at 120-140° C. shifted the optimum filling values toward lower concentrations of filler. Generally, heating induced tendencies similar to those caused by vulcanization, i.e., lowered swelling, reduced solubility, and raised strength.

Experiments were further made on heating butadiene rubber, by itself or mixed with 60% lampblack or 100% chalk, at 190-200° C. For the sake of comparison a sample was made of butadiene rubber with 10% of S and vulcanized for 120 minutes at 140° C. The specimens were then subjected to the usual tests. In all instances heating reduced swelling and solubility, but raised tear resistance and relative elongation as well as residual elongation.

Rubber Bearings. V. M. Shannikov, "Kauchuk i Rezina", 12, 18-22 (1939). **SN-57.**

The use, construction, lubrication, load, and friction calculation of rubber bearings are discussed. The rubber bearing is provided with either of two kinds of grooves through which the lubricant, i.e., water, flows. The grooves may be straight or helical. To insure proper lubrication the shaft must turn at a rate exceeding a cer-

(*Continued on page* 573)

Advances in Rubber during 1944[1]

John W. Liska[2]

THE nature of the problems faced by the rubber industry in the year 1944 stands in sharp contrast to the major effort of the preceding year. Having solved the essential and primary problem of "rubber" supply in a commendable manner (1),[3] there remained logically the secondary, though really no less essential, problems of the production of "rubber" goods of all types, in large quantities, from the several important synthetic rubbers, particularly GR-S, the "tire" synthetic. Although many of the natural rubber compounding practices employed by the rubber technologists were carried over with considerable success to the compounding of GR-S, it is also a fact that the highest quality GR-S products are not always produced by techniques or practices known to be successful with compounds having a natural rubber base. Since all of the available synthetics lack one or more of the desirable properties of natural rubber, it was necessary that the highest possible quality be attained in the synthetic products in order to minimize their known deficiencies. The same exhaustive tests which had resulted after years of experimentation in the development of high-quality natural rubber products had to be repeated on the synthetics as quickly as possible.

As in the preceding year, when considerable progress was made along this line, much of this work was again done by specially appointed industry-wide committees, and the results were made available to the entire industry without the formality of publication in the literature. In the current year, however, the results of many such investigations were released for publication through the efficient censorship clearance of the Rubber Director's Office. Among the many comprehensive studies which resulted in a rapid increase in the quality of synthetic rubber products are those on the effects of pigments (2-11), processing (12-13), softeners (14,) blending of synthetics (15-20), the effects of milling (21), compounding practices (22-29), vulcanization and molding of synthetic goods (30-40), the effects of sunlight, ozone, and aging (41-46), and the development of new physical and chemical methods of testing and evaluation (47-63).

The Armed Services' greatly increasing requirements for compounds which retained their flexibility at low temperatures were met by the introduction of specially designed synthetics and additional new low-temperature plasticizers (64-65). Improved methods of evaluating low temperature flexibility have been developed and decribed (66-71).

Additional data on cellular rubbers have been published (72), and new products made from this type of material, battery separators (73) and upholstery material (74), have been announced.

Plant Expansion Continued

At the time of this writing the non-technical phases of quantity production, adequate manpower and manufacturing capacity, have not been satisfactorily solved. Production in some lines, particularly large-size, heavy-duty tires for the Armed Services, is lagging behind schedule because of both of the above-mentioned factors (75-76). Civilian tire production, which, of course, rates a considerably lower priority, is consequently still farther behind anticipated schedule. In view of this situation the keynote of the entire industry during the current year has been expansion. In some instances production of war materials was transferred to new locations, thus freeing existing production space and facilities and experienced labor for tire manufacture (77). In others, large new plants for the manufacture of tires and tubes were designed and built, or are being built, in regions of relatively high labor availability (81-85). In spite of the tremendous increase in the amount of synthetics produced in the preceding year, further expansion, particularly in the line of specialty rubbers, was effected in the current year (84). The completion and achievement of full operation of the government's synthetic rubber plants on the Pacific Coast were also announced during the year 1944 (85). Significant, too, was the report of the completion of two standard GR-S plants and one GR-I plant in Canada (86).

Allied industries kept pace during this expansion period with the development of new types of pigments and building or planning of new plants for their production (87-90) and the building of new plants for the production of high-tenacity (tire cord) rayon (91).

Plasticizers, "Thiokols", and Guayule

A number of new "elasticators", plasticizers, and tackifiers were introduced (65, 92-99), though not nearly in so large numbers as in the preceding year, in further attempts to overcome some of the chief manufacturing difficulties involved in the substitution of synthetics for natural rubber.

New types of polysulphide rubbers, "Thiokol" Type ST (100) and Type LP-2 (101), were announced. The former is reported to have greatly improved resistance to cold flow while retaining the excellent solvent resistance of this class of material. Experiments on guayule rubber have been continued (102-104), but the difficulties of quantity production and extraction continue to keep this natural rubber in a position of importance secondary to that of most of the synthetics.

New Synthetic Rubbers

It will be recalled that in the interests of vitally important speed, standardization and full utilization of all available technological skill, the entire government-directed synthetic program was based on an original and fundamental decision to make but one tire rubber, GR-S. Until full production was achieved, most of the experimentation was confined to attempts to improve the basic GR-S polymer, rather than along the line of modification of the basic polymer or the development of a completely new tire rubber. The obvious success of the synthetic rubber program to date is sufficient proof that this decision was a wise one for that critical period. As soon as an adequate supply of synthetic rubber was assured, however, the investigations of new and improved tire rubbers and new manufacturing methods were gradually expanded.

The design of all the standard GR-S plants was based on a batch polymerization process which was carried over from laboratory investigations. Generally speaking, the production rate of an intermittent process is not

[1] Paper presented before the Rubber & Plastics Division, American Society of Mechanical Engineers, Hotel Pennsylvania, New York, N. Y., Nov. 30 1944.
[2] Physics research division, Firestone Tire & Rubber Co., Akron, O.
[3] Bibliography references are listed at the end of the article.

so high as that of a continuous process employing equipment of approximately the same size. Consequently the announcement of a new, continuous polymerization process (105) is of some interest and importance. Because of the increased production rate possible by this method it is reported that existing plants are capable of producing 40% more synthetic rubber than present capacity figures indicate.

It is too early to state how much better than GR-S the new synthetics are, since many details have not yet been made available, nor have the results of extensive tests been made public as yet. Copolymers of dichlorostyrene and butadiene are reported (106-107) to have excellent tensile, stretch, low-temperature properties, milling characteristics, tear resistance, and low heat generation and gas permeability. Better oil resistance than GR-S (though not so good as neoprene or "Thiokol") is claimed.

Complete information on another new synthetic will not be released until after the war (108). A reduction in tread cracking, increased abrasion resistance, and greater tackiness are reported for this synthetic. A further feature of this material is revealed in the claim that no major capital expenditures or changes in existing government GR-S plants are required.

High resistance to high octane gasoline, high tear resistance, and excellent aging properties are said to feature "Uskol" (109), another new synthetic which, according to claims, can be produced with present equipment, handles easily during manufacture, and blends with other synthetics.

A fourth new synthetic, introduced in the current year, is reported to be a co-polymer of butadiene and an as yet unnamed chemical (110). It is claimed to have low heat build-up and crack growth, but is more expensive than GR-S at present. Virtually no details have been made public regarding a fifth synthetic announced (111) though the process has already been made available to the entire industry. This development is said to embrace a technique by which a modified rubber having special advantages is produced.

As important as are the above-mentioned announcements, their real significance lies in the possibilities still in the future. There now appears to be a good chance that one or more of the synthetic tire rubbers will be able to compete favorably with natural rubber on a quality basis even after the end of the war when natural rubber again becomes available in quantity.

A number of fundamental studies of the polymerization process (112-114) and of the molecular structure of synthetics (115-118) have been published during the current year. These together with the large amount of unpublished committee work along these lines are responsible to a considerable degree for the rapid development of the new and improved copolymers mentioned above. That further advances can be expected is detailed in a timely report on polymerization and the future by a man who has been recognized for many years as one of the foremost scientists in the field of the chemistry of natural rubber (119).

Widely heralded as one of the most significant advances of the year is the successful incorporation of carbon black into GR-S latex on a factory production scale (120). The method, not yet adopted to any considerable extent, is claimed to yield vulcanizates having better physical properties in some respects than those produced in the usual manner, i.e., by milling or incorporating the carbon black in a Banbury mixer. Some milling is required even when the carbon black is introduced into the latex, but a large saving in power consumed and in milling time is claimed. This development had its origin, like many another new production method, in extensive laboratory studies, some of which had been previously described in the literature (121-122). With production facilities limited and production schedules seriously lagging, any process by which milling time can be reduced, thus making increased production rates a possibility, should be a valuable "assist" to the rubber industry and is one which will doubtlessly be put to further tests in the coming year.

Reports on the compounding of neoprene latex (123), the use of synthetic latices for wire insulation (124) and for fabric coating (125) have also been released, indicating a strong trend toward exploitation of this manufacturing technique. The first successful tires made with latex body stocks were built and described in the current year (126).

Reports on Rubber at War

A gradual lessening of war censorship has resulted in the release of information on many of the ways in which rubber, both natural and synthetic, is helping to win the war. The U. S. Army Ordnance Department has released an extensive report on GR-S tires designed for military use (127). Though admitting that GR-S tires do not stand severe overloading or sustained high speeds, the Army has expressed its complete confidence in synthetic rubber tires. Further tests on synthetic tires and tubes are given in a report describing the operation of the government test fleet at San Antonio, Texas (128).

One of the most vigorously debated questions has apparently been settled during the current year. The War Department is quoted as believing that rayon is superior to cotton in most tires, for heavy service, such as the Army car and truck (129). Civilian tests (on bus company fleets) also indicate a definite superiority of rayon over cotton. The claim is made (130) that in sizes 7.50/20 and up, 25 to 30% more tires would have been required over a given time period if it had not been for the use of rayon.

Several innovations in airplane tires and landing gear have been described. A new airplane ice tire with removable lugs is claimed (131) to make landings on icy runways considerably safer. A self-starting airplane tire, in which pre-rotation is achieved by means of vanes or fins in the sidewalls of the tire (132), is reported to increase the number of landings a tire can make before failure. An ingenious "flying runway" is also described (133). This device is reported to make landings and take-offs possible on swamp or soggy soils where even super-balloon tires bog down or cause the plane to nose over.

A new airplane tire testing machine has been built at Wright Field (134). Each newly designed synthetic tire is tested here under the same tremendous stresses to which it is subjected in actual service. Investigations of this kind are enabling tire designers to mnimize some of the shortcomings of the synthetic rubbers and to utilize their better features to a fuller extent.

Rubber airplane propeller cuffs which step up plane speed and increase engine cooling efficiency are reported (135). Life-saving balloons made of rubber, each having a lifting power of 6,000 pounds, are being used to salvage Navy planes shot down over water (136). Heating pads made of electrically conducting rubber are being used to maintain gun breeches at the required temperatures for instantaneous firing at high altitudes, to prevent jamming of the guns at low temperatures (137). A new anti-icing boot is also being made of conducting rubber (110, 138). Additional data on this

unusual application of rubber has been published in the current year (139).

Some of the war uses of Multipore have been released for publication (140). This porous rubber is being used in the preparation and filtering of blood plasma, in the silver plating of bearings for airplane engines, in the filtering of fruit juices, etc. Many other industrial peacetime uses are predicted for this material.

Life saving suits (141) and waterproof instrument bags (142), made of synthetic rubber, are being made for the Navy and Coast Guard Services. An ingenious combination of materials, asbestos and synthetic rubber, is being used in the manufacture of a collapsible container which can be used for cooking and sterilizing (143).

Destructive electrolytic action has been responsible for many expensive maintenance delays and replacements on the Navy's sub-chasers. This problem has been neatly solved by "flame-spraying" "Thiokol" on to the steel propeller shafts (144). It is reported that the new process has been extremely successful in reducing replacements and maintenance to a minimum.

A newly patented gas mask which keeps fresh air circulating has been announced (145). Inflatable invasion boats made of synthetic rubber are reported, together with collapsible aircraft cargo containers, which are particularly good for shipping extremely corrosive materials, such as hydrofluoric acid (146). A rubber lifeboat large enough to hold 25 men and supplies has been described (147). A synthetic rubber tape is being used to seal the fuselages, gun turrets, gas tanks, and Plexiglas enclosures of our war planes against leaks caused by strains of battle maneuvers (148). Latex dipped insulated wire is being used by the Army in large quantities (149). A new-type lifeboat, especially designed to prevent the capsizal of inflatable craft of this type, has been announced (150). An extremely mobile, rubber track vehicle named the "Weasel" has been described (151). Another ingenious combination of materials, "Thiokol" and ground cork, is being employed as a substitute for rubber matting. This new lightweight walkway coating is reported to adhere well to metal, plywood, and painted surfaces and is claimed to be resistant to fire, gasoline, salt water, oil, and hydraulic fluid, is easily applied, and dries quickly (152). The development of a tire vulcanizing device employing electronic principles was discussed (153). This device, designed to replace Army tire repair equipment weighing tons and taking hours to operate, is reported to be mobile, and through "internal" heating is said to make better sectional and spot cures within minutes.

Important aids to our Armed Forces in the invasion of northern France were collapsible rubber contour maps (154). These maps, made by spraying natural rubber latex on prepared forms, could be rolled up, after being thoroughly dried, into a small parcel for shipment in landing barges. After landing and expanding into strange territory our infantry and tanks were able in many cases to obtain much valuable information regarding the terrain simply by unrolling and studying these contour maps.

Physical Research Results Reported

The electron microscope has been employed extensively in the comparison of natural and synthetic rubber fibers and in the study of the nature of carbon black reenforcement (155-156). There is much evidence to indicate that this physical research tool will be very widely used in future years, as more and more laboratories announce purchase and installation of these extremely high-power microscopes.

At the symposium on the physics of rubber and other high polymers held late in 1943, a number of important papers were presented by both academic and industrial physicists. Many of these papers have since been published. Included among these works are studies on the theory of elasticity of rubber (157), stress relaxation (158-159), plasticity (160-162), X-ray diffraction and light scattering (163-165), hysteresis and elasticity (166-167), second-order transition effects (168), and infrared analysis (169-170).

The culmination of the activities of this group, begun at the physics symposium, was the organization of a new Division of High Polymer Physics within the framework of the American Physical Society in June of the current year (171). Papers, soon to be published in the *Journal of Applied Physics,* were presented on such topics as the theory of elasticity, reenforcement of rubber, electrostatic properties of rubber and GR-S, speed of retraction of rubber, stress-strain-temperature relations, physical properties of natural and synthetic rubbers at low temperatures, molecular weights, and brittle points of high polymers. If the uniformly high quality of the papers presented by this group in the current year and the individuals' interest and enthusiasm are at all indicative, future significant contributions to the knowledge and science of rubber can be expected.

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Improving Guayule Rubber by Shrub Retting[1]

Jonathan W. White, Jr.,
Now with Office of Censorship, United States War Department, Washington, D. C.

Joseph Naghski,
Eastern Regional Research Laboratory,[2] Philadelphia, Pa.

Paul J. Allen,
Now with Guayule Rubber Extraction Research Unit, United States Department of Agriculture, Salinas, Calif.

Sam R. Hoover,
Eastern Regional Research Laboratory, Philadelphia, Pa.

J. J. Willaman,
Eastern Regional Research Laboratory, Philadelphia, Pa.

WHEN production of guayule rubber was undertaken by the government in 1942, research was instituted both on production methods and on improvement in quality of the rubber. Among methods bearing on the latter the Spence[3] process was studied. This process, called retting by Spence because of its loose analogy to flax retting, consists in maintaining the shrub in a moist condition in the presence of air for a period of days. Decomposition of the shrub "due to natural agencies"[3] takes place, and then the rubber is extracted by customary mechanical methods. This rubber has a higher tensile strength and lower resin content than rubber from shrub that has not been retted. Records of the Intercontinental Rubber Co.[4] show that the process was tried at its Torreon, Mexico, plant for several months. Great difficulty was encountered in obtaining uniform results, particularly in bulks of 30 to 50 tons. The shrub was piled 10 feet deep in open bins. Although retting took place at the surface, within the mass the shrub did not ferment, at least in the desired manner. Several methods of increasing aeration were tried unsuccessfully. The process was abandoned, probably because there was no overall improvement in the rubber throughout the piles.

Since there are many comments in these records to the effect that shrub in small piles, or around the surface or near air vents in the large piles, did ferment properly and yielded better rubber, we concluded that possibly lack of air was still the limiting factor and decided to study the process from that angle. Our results have borne out this conclusion. Access of air to all parts of the shrub mass is a primary requisite, and if other conditions, such as moisture and temperature, are correct, satisfactory retting takes place, and improved rubber results.

Previous retting work had been done with shrub seven years old or more. Since the government program involved the use of a shorter growing period, it was necessary to ascertain whether two-year-old shrub could be retted satisfactorily. A complete bacteriological and biochemical study of the microorganisms involved in the process has already been reported.[5] The present paper reports the effect of retting on the quality of the rubber recovered from the retted shrub. A study of resin digestion by organisms isolated during these experiments has also been reported.[6]

Equipment and Methods

The retting tank was fully described, with a diagram, in a previous paper.[5] It was 2½ feet in diameter and four feet high, with four-mesh wire false bottom and facilities for controlling water temperature, air flow through a sparger [sprinkler] in the bottom, and circulation of bottom liquor over the retting shrub. In addition to an electric heater for maintaining the temperature of the liquor, steam could be passed through the air sparger for rapid heating when necessary.

Air-dried two-year guayule shrub was defoliated, cut to two-inch lengths in a rotary knife cutter, and crushed to ½- to ¼-inch thickness in a cane mill. For chemical analysis the prepared shrub was riffled to a 1% to 2% sample, which was cut to pass a 1/16-inch screen and further riffled if necessary. Moisture, benzene-soluble (rubber hydrocarbon), and acetone-soluble contents ("resin") were determined, the latter two by a modification of the Spence-Caldwell procedure.[7] All analyses except moisture are reported on a moisture-free basis.

Shrub of known weight was placed in the tank and hydrated either by boiling and cooling or by frequent spraying with warm water. It was then maintained in a moist condition, without inoculation, with slow ingress of warmed and humidified air into the tank. The rate of air flow was 10 cubic feet per hour for the first three experiments described below, corresponding to approximately two changes of air per hour. The temperature of the shrub was controlled by spraying with retting liquor. After a suitable interval the entire mass was removed, weighed, and mixed. A sample was then taken for recovery of the rubber by milling, and the residue was returned to the tank for continued retting.

The sample was cut wet in a rotary knife cutter to pass through a ½-inch screen, grab-sampled for analysis, and subjected to a standard pebble-milling procedure for recovery of rubber. The crude rubber obtained was dried in vacuum and compounded according to the following formula:

	Parts
Crude rubber	100
Captax	1
Zinc oxide	5
Stearic acid	1.5
Sulphur	3.5

Mill temperature, 115° F.
Cure temperature, 274° F.

Test sheets four by four inches by 0.03-inch in size were used. Observations in this laboratory indicate that sheets of this thickness give results about 300 p.s.i. higher than the standard thickness. This does not invalidate the results, since the data here are all relative.

Effect of Temperature of Retting

The first major variable studied was the temperature of the fermentation. Three ranges were selected, 95-100°, 107-118°, and 122-129° F. Shrub used in these experiments was preboiled 30 minutes in an effort to hasten decomposition. Such treatment should remove soluble substances, hydrate, and soften the tissue to permit easier

[1] "Natural Rubber from Domestic Sources." Paper No. 5.
[2] One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, United States Department of Agriculture.
[3] D. Spence, U. S. patent No. 1,918,671 (1933).
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[5] J. Naghski, J. W. White, Jr., and Sam R. Hoover, *J. Bact.*, 48, 159-78 (1944).
[6] P. J. Allen, J. Naghski, and Sam R. Hoover, *Ibid.*, 47, 559-72 (1944).
[7] C. O. Willits, W. L. Porter, and C. L. Ogg (in preparation).

penetration by the microorganisms and make for a more selected residual microflora.

The effect of the temperature of retting on the composition of the shrub is shown in Table 1. There was no apparent difference in percentage of resin (acetone extract) in the shrub. Decomposition of the resin fraction of the shrub occurred, however, as is evident when the resin content is considered on the original dry-weight basis. The increase in rubber hydrocarbon content was proportional to the dry-weight loss. No significant loss of rubber hydrocarbon to the liquor occurred. Excellent rubber "balances" at the beginning and end of the experiments showed that no decomposition of rubber took place under these conditions, although ZoBell and Grant found that many bacteria could oxidize rubber under certain conditions.[8]

TABLE 1. EFFECT OF TEMPERATURE OF RETTING ON THE COMPOSITION OF PREBOILED SHRUB

Time Retted Days	Moisture %	Resin %	Rubber Hydrocarbon %	Loss of Dry Matter, Cumulative %
		Retted at 95-100° F. (U24S4)*		
0†	14.1	6.1	7.5	0
0‡	12.0	6.6	8.9	13.3
4	67.9	6.9	10.3	24.1
8	75.3	7.1	10.9	25.1
		Retted at 107-118° F. (U24S3)		
0†	14.1	6.1	7.5	0
0‡	12.0	6.6	8.9	13.3
4	61.0	6.6	10.5	19.3
7	65.9	7.1	11.2	26.6
13	68.7	6.4	11.7	30.3
		Retted at 122-129° F. (U24S5)		
0†	18.0	7.2	9.0	0
5	61.1	6.9	11.3	16.9
9	64.4	6.6	11.7	21.2
14	66.3	6.4	12.4	26.2

* Code numbers correspond to those used previously.[5]
† Not boiled or retted.
‡ Boiled, but not retted; dried before milling.

TABLE 2. EFFECT OF TEMPERATURE OF RETTING ON THE COMPOSITION OF CRUDE RUBBER MILLED FROM RETTED PREBOILED SHRUB

Time Retted Days	Resin %	Rubber Hydrocarbon %	Insolubles	Ratio of Resin to Rubber
		Retted at 95-110° F. (U24S4)		
0*	22.3	64.4	13.2	0.35
0†	23.8	59.8	16.4	0.40
4	19.2	67.1	13.7	0.29
8	16.5	68.9	14.6	0.24
		Retted at 107-118° F. (U24S3)		
0*	22.3	64.4	13.2	0.35
0†	23.8	59.8	16.4	0.40
4	19.8	68.7	11.5	0.29
7	19.5	66.9	13.6	0.29
13	15.1	72.5	12.7	0.21
		Retted at 122-129° F. (U24S5)		
5	19.9	68.4	11.7	0.29
9	18.8	69.3	11.9	0.27
14	17.0	72.5	10.5	0.23

* Not boiled or retted.
† Boiled, but not retted.

TABLE 3. TENSILE PROPERTIES OF CRUDE RUBBER MILLED FROM RETTED PREBOILED SHRUB

Time Retted Days	Optimum Cure Minimum	Tensile at Break P.S.I.	Modulus at 600% E. P.S.I.	Ultimate Elongation %	Shore Hardness
		Retted at 95-100° F. (U24S4)			
0*	60	1700	460	700	32
0†	45	1740	1380	630	39
4	45	1610	550	760	40
8	30	1840	800	780	45
		Retted at 107-118° F. (U24S3)			
0*	60	1700	460	700	32
0†	45	1740	1380	630	39
4	30	2470	870	730	40
7	30	2400	1240	720	40
13	45	2340	1480	690	47
		Retted at 122-129° F. (U24S5)			
5	20	2510	820	820	42
9	45	2360	830	730	45
14	60	2370	770	760	38

* Not boiled or retted.
† Boiled, but not retted.

Samples from each ret were milled, and the crude rubber "worms" were boiled at atmospheric pressure to cause bits of floating bagasse to sink. AgeRite Powder antioxidant was added to the mill in each case. Analytical data on the crude rubber from the experiments outlined in Table 1 are given in Table 2, and results of physical tests on the vulcanized rubber are given in Table 3.

Results of the temperature series show little or no analytical differences between the three experiments, except that in the 95-100° experiment higher insoluble content was found in the rubber. Table 3, however, shows that only in the 107-118° and 122-129° rets were there any significant improvement in the physical properties of the rubber. The poor result in the 95-100° fermentation might be due to greater frequency of spraying, resorted to in order to maintain the lower temperature. This waterlogged the mass and interfered with proper retting.

Retting of Unboiled Shrub

Table 3 also shows that no further increase in tensile value of rubber from retted boiled shrub occurred after about four to seven days. Previous small-scale experiments had shown that in the retting of unboiled shrub tensile values continued to increase up to 22 days, with a corresponding decrease in acetone extracts, although disintegration of the plant tissue was less than that in boiled shrub. Furthermore boiling facilitated softening of the tissue during retting to such an extent that undue packing resulted, forming areas less pervious to air. For these reasons subsequent experiments were carried out on unboiled shrub.

Since no definite effect of temperature of retting was observed in the previous three experiments, except that the low temperature was undesirable, the temperature was allowed to range from 107° to 122° F. Sufficient shrub for two millings was retted, and the millings were made at four and eight days. The shrub was hydrated by 12 five-minute circulations of the liquor the first day. Analyses of the retted shrub and of the recovered rubber are presented in Table 4, and results of physical tests of the rubber in Table 5.

TABLE 4. COMPOSITION OF RETTED UNBOILED SHRUB AND OF RUBBER MILLED FROM IT

Time Retted Days	Moisture %	Resin %	Rubber Hydrocarbon %	Insolubles %	Loss of Dry Matter, Cumulative %
		Unboiled Retted Shrub (U24S6)			
0*	39.9	7.5	9.3	...	0
4	61.1	7.1	10.1	...	14.0
8	63.6	6.3	10.4	...	16.6
		Crude Rubber Milled from Unboiled Retted Shrub			
0*	...	19.4	69.1	11.4	...
4	...	20.1	68.4	11.5	...
8	...	18.3	71.2	10.5	...

* Control analyses for a different, but comparable lot of material are given.

TABLE 5. TENSILE PROPERTIES OF CRUDE RUBBER MILLED FROM RETTED UNBOILED SHRUB

Time Retted Days	Optimum Cure Minimum	Tensile at Break P.S.I.	Modulus at 600% E. P.S.I.	Ultimate Elongation %	Shore Hardness
0*	45	2260	510	830	29
4	30	2340	610	810	41
8	30	2610	520	840	43

* See footnote, Table 4.

Comparison of Tables 4 and 5 with Tables 1, 2 and 3 shows that although the composition of the crude rubber from the unboiled shrub was similar to that obtained from the boiled shrub, the tensile values indicated a different trend with time of retting. In this case the maximum tensile strength was not passed at about four days, but there was a continued increase to at least eight days.

[8] C. E. ZoBell and C. W. Grant, *Science*, 96, 379 (1942).

With this in mind the next experiment was planned to run for 21 days.

Because of limited raw material, the quantities retted in the previous four experiments were sufficient to fill the retting tank only to a depth of about 20 inches. As previously noted, the difficulty encountered by the Intercontinental Rubber Co. was in obtaining uniform retting throughout a large bulk of material. Enough shrub to fill the tank completely was used in the next two experiments, giving a shrub depth of three feet. Furthermore, a drum of water (total weight, 570 pounds) was placed on top of the sparger to simulate the packing effect of the weight of an additional 2.2 feet of wet shrub. The rate of aeration was increased to 100 cubic feet per hour, or 6.5 changes per hour.

At the end of seven days' retting the tank was emptied, and samples of shrub were removed for milling as follows: first, top two inches; second, center of the bulk; third, remainder (well mixed). Enough shrub for two milling batches was taken from the mixed bulk and returned to the tank for further retting, and representative samples were removed at 14 and 21 days. The results of the experiment are shown in Tables 6, 7, and 8.

Comparison of the data in Tables 6, 7, and 8 with the results Spence[3] obtained by retting in shallow layers reveals excellent agreement. Results in Table 8 show that retting occurred throughout the mass, although at a slightly slower rate in the center than at the top. Our fermentation was not carried beyond 21 days, since it was felt that this represented the commercially feasible time limit. Figure 1, based on the data in Tables 7 and 8, shows close interrelation between retting time, resin content, tensile strength, and rubber hydrocarbon content. Walter[9] found no qualitative differences in the constituents isolated from the resin of retted and unretted guayule in these experiments.

[9] E. D. Walter, *J. Am. Chem. Soc.*, 66, 419-21 (1944).

TABLE 6. COMPOSITIONS OF UNBOILED SHRUB (U24S7) RETTED IN BULK

Time Retted Days	Description	Moisture %	Resin %	Rubber Hydrocarbon %	Loss of Dry Matter, Cumulative %
0	Control	13.0	6.3	7.1	0
7	Bulk	60.5	6.8	8.4	18.6
7	Center	66.6	7.3	9.0	...
7	Top	65.5	6.2	8.6	...
14	Bulk	67.2	5.7	8.9	23.6
21	Bulk	69.3	5.8	9.4	29.4

TABLE 7. COMPOSITION OF CRUDE RUBBER FROM UNBOILED SHRUB (U24S7) RETTED IN BULK

Time Retted Days	Description	Resin %	Rubber Hydrocarbon %	Insolubles %	Ratio of Resin to Rubber
0	Control	22.7	66.0	11.3	0.34
7	Bulk	18.0	71.9	10.1	0.25
7	Center	22.3	67.9	9.8	0.33
7	Top	19.6	70.0	10.4	0.28
14	Bulk	15.1	74.4	9.5	0.20
21	Bulk	13.5	77.2	9.3	0.17

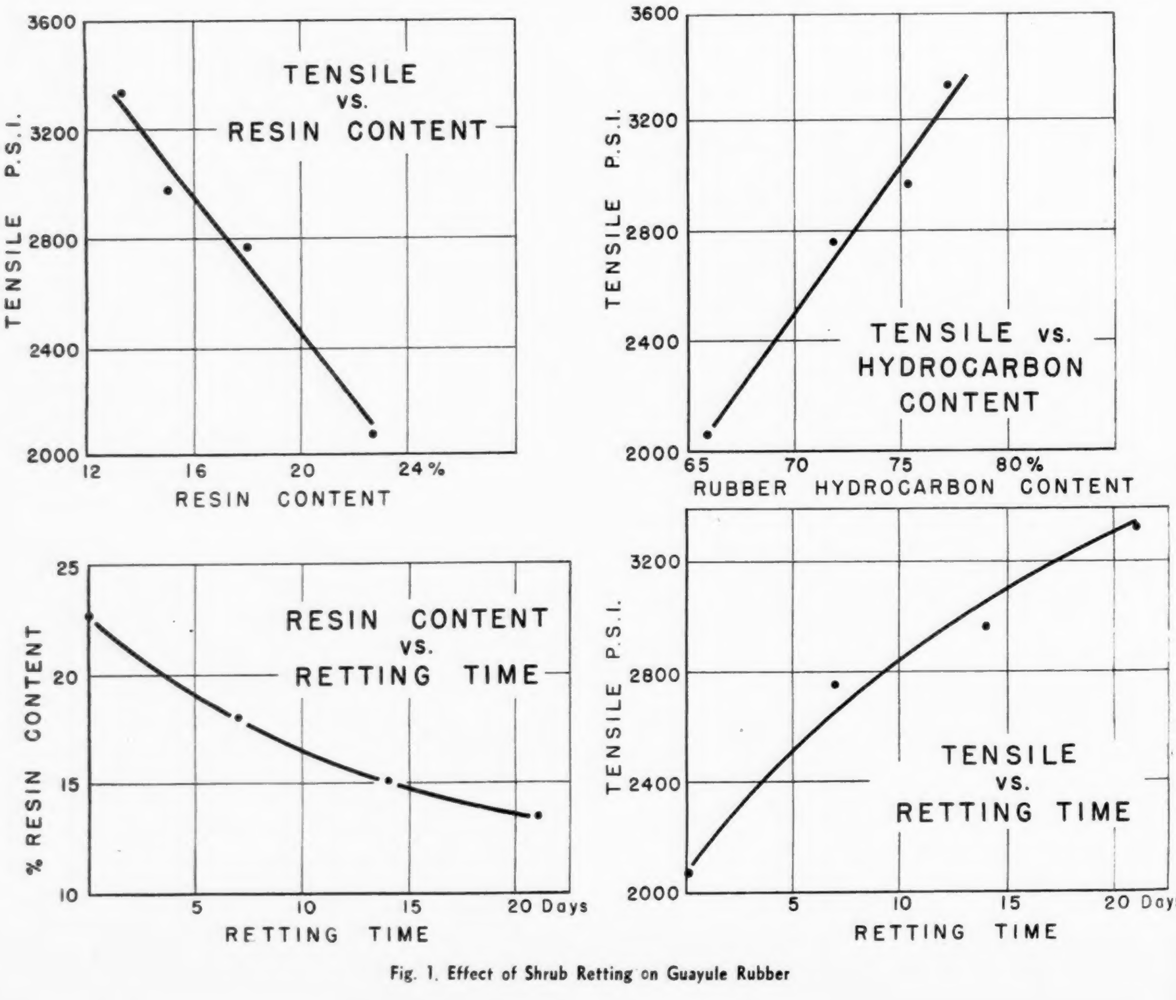

Fig. 1. Effect of Shrub Retting on Guayule Rubber

Table 8. Tensile Properties of Crude Rubber from Unboiled Shrub Retted in Bulk

Time Retted Days	Description	Time of Cure Minutes	Tensile at Break P.S.I.	Modulus at 600% E. P.S.I.	Ultimate Elongation %	Shore Hardness
		20*	2070	530	800	44
		30	2050	570	790	46
0	Control	45	1770	640	740	47
		60	1650	640	730	47
		80	1600	650	730	48
		20	2650	480	860	37
		30	2730	630	810	39
7	Bulk	45	2450	630	800	40
		60*	2760	710	790	40
		80	2250	630	750	40
		20	2330	500	850	27
		30*	2560	710	800	33
7	Center	45	2410	950	780	36
		60	2380	950	730	37
		80	2270	1120	710	36
		20	2620	560	850	33
		30	2480	630	820	36
7	Top	45*	2820	760	800	37
		60	2700	840	780	37
		80	2510	870	760	38
		20	2540	280	860	32
14	Bulk	30*	2970	500	840	30
		45	2750	510	810	32
		60	2630	490	820	35
		20*	3330	460	910	37
		30	3270	570	860	38
21	Bulk	45	3170	600	840	38
		60	2950	560	840	40
		80	3050	580	850	42

* Optimum cure.

The final experiment was a duplication of the one last described. Results were substantially in agreement: An 1130-p.s.i. tensile increase (from 1920 to 3050 p.s.i.) was obtained, with a decrease in resin content from 20.6 to 12.3%.

The improved tensile properties shown by rubber from retted guayule shrub probably reflect the improved compounding characteristics of the rubber. It is also possible[3] that the presence in the retted rubber of microbiological decomposition products may contribute to the better tensile properties. There is no reason to believe that an improvement is made in the quality of the actual rubber hydrocarbon itself.

Consideration of the data shows that, as is usual in biological processes, there is an interrelation among temperature, oxygen supply, time, and water content. Therefore the conditions for retting cannot be defined in terms of any one of these requirements, nor indeed can successful retting be carried out if any one of these is not controlled.

Further laboratory and pilot plant investigations are being carried out by the Guayule Rubber Extraction Research Unit of the Bureau of Agricultural and Industrial Chemistry, Salinas, Calif.

Summary

1. Forced aeration made it possible to ret guayule shrub under packing conditions equivalent to a depth of at least 5.2 feet. This aerobic retting improved the properties of the rubber, in confirmation and extension of the results obtained by Spence, who did not use forced aeration.

2. Under the conditions employed (adequate aeration, 60 to 70% moisture, and 104° to 129° F.) about 1200-p.s.i. improvement in tensile strength of guayule rubber was obtained by retting the shrub for 21 days, with proportionately less increase in shorter time.

3. The resin content of the recovered rubber was reduced from 20-23 to 12.3-13.5% by the process.

Acknowledgment

The cooperation of the Chemical Engineering and Development Division in the preparation and milling of the shrub, and of the Analytical and Physical Chemistry Division in the analysis and physical testing of the rubber, is gratefully acknowledged. The authors also take pleasure in acknowledging the technical assistance of Nancy O'Connell Buck, of this Laboratory.

Recent Russian Literature

(*Continued from page* 565)

tain minimum, which in turn is determined by the load. If the circular velocity is below this minimum, forced lubrication must be employed. The following characteristics were accepted for rubber used in rubber bearings: tensile strength, 214 kilograms per square centimeter (3043.7 pounds per square inch); relative elongation, 79.2%; residual elongation, 44%; hardness, 0.73. The friction coefficient of several NK and SK bearings was determined with the aid of a special apparatus. The friction coefficient was affected only slightly by changing the thrust on the bearing, but increased sharply by diminishing the circular velocity. Several graphs are included giving the relation between thrust and coefficient of friction, pressure distribution in the bearing of a rotating shaft, etc.

(*To be continued*)

Advances in Rubber

(*Sontinued prog page* 569)

(149) "Insulated Wire Latex Dipped," *Ibid.*, 55, 391 (1944).
(150) "New Lifeboat Developed by General Tire Prevents Capsizing," *Ibid.*, 55, 393 (1944).
(151) "Army 'Weasel' Revealed," *Ibid.*, 55, 499 (1944).
(152) "Non-Skid Airplane Coating," *Ibid.*, 55, 503 (1944).
(153) "Tire Vulcanizing Device Uses Electronic Principles," *Ibid.*, 55, 391 (1944).
(154) "Collapsible Rubber Contour Maps," *Ibid.*, 55, 389 (1944).
(155) "Natural and Synthetic Rubber Fibers, Electron Microscope Studies," C. E. Hall, E. A. Hauser, D. S. Le Beau, F. O. Schmitt, and P. Talalay, *Ind. Eng. Chem.*, 36, 634 (1944).
(156) "Electron Microscope Studies of Colloidal Carbon in Vulcanized Rubber," W. A. Ladd, *Ind. Eng. Chem.* (*Anal. Ed.*), 16, 642 (1944).
(157) "Theory of Elasticity of Rubber," E. Guth, *J. Applied Phys.*, 15, 294 (1944).
(158) "Stress Relaxation of Natural and Synthetic Rubber Stocks," A. V. Tobolsky, I. B. Prettyman, and J. H. Dillon, *Ibid.*, 15, 380 (1944).
(159) "Drift and Relaxation of Rubber," M. Mooney, W. E. Wolstenholme, and D. S. Villars, *Ibid.*, 15, 324 (1944).
(160) "Rheological Properties of Natural and Synthetic Rubbers," R. H. Kelsey and J. H. Dillon, *Ibid.*, 15, 352 (1944).
(161) "New Extrusion Plastometer," H. A. Schultz and R. C. Bryant, *Ibid.*, 15, 360 (1944).
(162) "Effect of Thixotropy on Plasticity Measurements," H. Green and R. N. Weltmann, *Ibid.*, 15, 414 (1944).
(163) "Light Scattering in Solutions," P. Debye, *Ibid.*, 15, 338 (1944).
(164) "X-Ray Studies of Chain Polymers," I. Fankuchen and H. Mark, *Ibid.*, 15, 364 (1944).
(165) "Observations on the X-Ray Structure of Rubber and the Size and Shape of Rubber Crystallites," S. D. Gehman and J. E. Field, *Ibid.*, 15, 371 (1944).
(166) "Hysteretic and Elastic Properties of Rubber-Like Materials under Dynamic Shear Stresses," J. H. Dillon, I. B. Prettyman, and G. L. Hall, *Ibid.*, 15, 309 (1944).
(167) "Hysteresis Losses in High Polymers," H. S. Sack, J. Motz, and R. N. Work, *Ibid.*, 15, 396 (1944).
(168) "Thermal Expansion and Second-Order Transition Effects in High Polymers," R. F. Boyer and R. S. Spencer, *Ibid.*, 15, 398 (1944).
(169) "Further Studies of the Infrared Absorption of Rubber," D. Williams and B. Dale, *Ibid.*, 15, 585 (1944).
(170) "Infrared Spectroscopy, Industrial Application," R. B. Barnes, U. Liddel, and V. Z. Williams, *Ind. Eng. Chem.* (*Anal. Ed.*), 15, 659 (1943).
(171) "Division of High Polymer Physics Holds Inaugural Meeting," *Rubber Age* (*N. Y.*), 55, 371 (1944); INDIA RUBBER WORLD, 110, 541 (1944).

EDITORIALS

Loose Talk Means Lost War Production

THERE were two incidents which occurred recently, which, although they may not warrant direct application of the warning popularized during the present war, i.e., "Loose Talk Means Lost Lives," do require the application of a new warning for the home front: namely, "Loose Talk Means Lost War Production."

The first of these incidents has to do with the unwarranted and absurd accusation of a local URW union leader, C. V. Wheeler, of Akron, O., who on December 28 filed a complaint with the Army, the War Production Board, and the URW international president that Plant 2 of the Goodyear Tire & Rubber Co. in Akron could produce 5,000 more heavy-duty tires a day with better material supply and scheduling. Subsequent investigation by the Army cleared the Goodyear company of any mismanagement and declared Wheeler's charges to be unfounded and not even in agreement with other members of his own local union.

"The opinions of duly elected local union officers should be withheld from public expression until they have some chance of being factually supported," the Army report stated. "They should have no public expression when the purpose is solely one of propaganda." A most significant statement also contained in this report added: "The morale and patriotic sincerity of the vast bulk of the workers in this plant in the existing crisis—of which there can be no dispute—is in no way aided by the public expression of a loose and unwarranted opinion of a local labor leader."

The second incident is the accusation by Drew Pearson, Washington columnist, on January 8, that when War Mobilization Director James Byrnes on December 15 extended for four months the premium prices on passenger car tires, he had completely disregarded OPA figures which showed there was no excuse for these premium prices. Pearson quoted corporate profit figures of the rubber companies, before taxation or renegotiation, during 1943 and part of 1944, as compared with profit figures during 1936-39, to support his contention that the rubber industry was making more than enough profit during the war period and should not require this additional income even during its all-out heavy-duty tire production drive of the next four months. No direct reply has been made by either Byrnes or rubber industry executives except that a spokesman for the latter said that they felt that nothing would be gained by getting into a "brawl" with Pearson. Another reliable spokesman for the industry stated that Pearson's selection of profit figures was obviously unfair and incomplete since he took gross profit rather than net profit figures and did not take into account the tremendously increased volume of business the major companies are engaged in at the present time, which includes hundreds of other war products besides tires.

As of further interest in the Pearson matter, a comparison of sales and net profit figures for the industry during the same periods tells an entirely different story. Gross sales for the rubber industry during the period of 1936-39 averaged about one billion dollars a year, as compared with the year 1944 when gross sales totaled four billion dollars. Profits after taxes during the 1936-39 period averaged 50 million dollars annually, and during the year 1944, in spite of a sales volume four times that of 1936-39, profits after taxes amounted to 100 million dollars. Thus the ratio of profits to sales in the 1936-39 period was 5%; while in 1944 this ratio was only 2½%.

There are several other things that were not mentioned by Mr. Pearson, probably not because to use them would have weakened his case, but more because as he is not business or production minded, they just would not have occurred to him. First, if your business had been called upon to undertake an all-out production drive, seven days a week for 120 days, in order to provide a greatly increased volume of goods urgently needed by the Armed Services, with the resultant strain on your company's men and machines and with the very definite possibility of immediate production costs rising exponentially during this period and with long-term production costs higher owing to the replacement of much expensive equipment, would you want to reduce your income by 10% on your next largest volume production, when this represented your best chance of breaking even or realizing a reasonable profit for the year's operations? Next, since the volume of production on this second item has been reduced by government order by more than one-third to permit greater production of the urgently needed goods, and since in addition the price reduction on the second item would involve considerable paper work, which you could ill afford during the production drive on the war goods, would you not want to prevent any further change in the status of your production and marketing of the second item? Of course this is all immediately after you have just spent three years converting your production from regular to special war products and in some cases back again to regular products, and establishing on the way some outstanding production records on totally unrelated products such as ammunition and planes and parts.

The lesson that can be learned from these incidents is that their purpose was merely for propaganda and for personal gain, with no thought or feeling of responsibility as to the effect on the persons accused or the war effort. It is naive to believe that our war production effort by both labor and management was not hindered by these accusations, made without complete facts to support them. Truly, loose talk means lost production—war production—and the results that will follow any reduction in war production need not be repeated here.

Scientific and Technical Activities

Bolton Receives Perkin Medal

THE Perkin Medal of the Society of Chemical Industry was awarded to Elmer K. Bolton, chemical director of E. I. du Pont de Nemours & Co., Inc., on January 5 at a meeting sponsored by the American Section of the Society and held jointly with the American Chemical Society, the American Institute of Chemical Engineers, the Electro-Chemical Society, and the Societe de Chimie Industrielle at the Commodore Hotel, New York, N. Y. The Perkin Medal, named for its first recipient, Sir William Henry Perkin, the British scientist who developed aniline dyes, was awarded to Dr. Bolton in recognition of his outstanding accomplishments in the field of industrial research. Norman A. Shepard, chairman of the American Section of the Society of Chemical Industry, presided at the dinner. Seated at the speakers' table were the heads of the societies meeting with S.C.I. and executives of the du Pont company.

Elmer K. Bolton

The medal was presented by Marston T. Bogert, professor emeritus of chemistry, Columbia University, and senior past president of S.C.I. In the citation read by Dr. Bogert, the medalist was particularly recognized "for his leadership in the synthesis of neoprene, the first general-purpose synthetic rubber to be developed either in this country or abroad, and for his direction of nylon research."

C. M. A. Stine, du Pont vice president, who himself received the Perkin Medal in 1940, spoke on "The Accomplishments of the Medalist" with special emphasis on the undertaking in 1925 by Dr. Bolton of a search for a practical synthetic rubber, which through his persistent stimulation and guidance resulted in the commercial manufacture of chloroprene synthetic rubber. It was also pointed out that with the initiation in 1928 of a broad program to explore the fundamentals of polymerization phenomena under the late Wallace H. Carothers, synthetic polyamides were discovered, and under Dr. Bolton's direction the development of nylon as a new and revolutionary commercial textile fiber was brought to successful fruition. Lammot du Pont, chairman of the board of the du Pont company, spoke on "The Personal Side of the Medalist." Mr. du Pont paid special tribute to Dr. Bolton for his exceptional vision and mental versatility, his ability to work in harmony with all those in all departments of his company, and his inherent modesty with regard to his own accomplishments.

In accepting the Perkin Medal for 1944, Dr. Bolton addressed the more than 500 members and guests of the various societies in attendance at the meeting on the subject of "Du Pont Research." In his opening remarks he said that:

"In accepting the Perkin Medal, I am deeply conscious of the fact that any credit for certain research accomplishments with which I have been connected belongs to the organizations of able chemists with whom it has been my privilege to be associated. As their representative, I am happy to accept this award because, in honoring me, you honor them."

In his paper Dr. Bolton discussed the history, growth, and organization of du Pont research from the very beginning of the company in 1802. He mentioned how du Pont research, at the start, was carried out in works laboratories under the direction of the works superintendent. This was followed by the first formal research laboratory at the Repauno dynamite plant in 1902, and research activities were then extended and broadened with the establishment of the Experimental Station, near Wilmington, Del., in 1903. In 1911 a centralized chemical department was established to take care of all research activities of the company, and this plan continued in operation until 1921, when a complete reorganization of the methods by which the business of the company was conducted marked the beginning of the present decentralized plan of research. The manufacturing divisions are organized with research divisions, responsible only to the general managers of the divisions; while the central chemical department, wholly independent of any manufacturing department, reports directly to the president and the executive committee and is chiefly concerned with pioneering applied and fundamental research.

Research is a major rather than a minor activity in the du Pont company. Today du Pont's research organization comprises 33 research laboratories, with technical and non-technical personnel of about 3,500 men and women. The early inventor, working without aid or backing, many times met rebuffs, discouragement, and ridicule, Dr. Bolton said. Today the achievements of modern industrial research have led the American people not only to accept the new, but to expect and demand it.

More than 2,000 different materials, including, in addition to intermediates and dyes, rubber chemicals, petroleum chemicals, synthetic camphor, textile finishes, detergents, perfume bases, and neoprene, are now manufactured by the du Pont organic chemicals department. The success of this undertaking was attributed to three important factors: the expenditure of large amounts of capital during the many profitless years, close cooperation of research, production and sales, and faith on the part of Pierre, Irénée, and Lammot du Pont that the venture was fundamentally sound, and their confidence that the organization could put this undertaking on a successful basis.

In discussing the development of neoprene, Dr. Bolton gave credit to W. F. Harrington, now a vice-president, who in 1925 as general manager of the dyestuffs department decided to back the recommendations of the research group and encouraged the initiation of this project, which led to the development of this first general-purpose synthetic rubber. In telling the story of the development of nylon two points which have an important bearing on du Pont research were emphasized—first, the value of teamwork, and second, the importance of semi-works or pilot-plant operations.

In conclusion Dr. Bolton pointed out that research becomes of service in the ordinary walks of life only when it can be translated into processes or products which contribute to raising the scale of living, to the improvement of health, to the promotion of industry and agriculture, and to the national defense.

"From the colonial days down to the present, our patent system has been a great stimulus to research, and an incentive to the creation of new products and processes. Large expenditures such as were involved in developing neoprene and nylon, for example, were justified because of the patent protection it was possible to establish. Were it not for this protection, the stimulus to research and invention would be greatly diminished, whether by a lone individual, by small business, or by so-called big business," he added and then said finally, "Since World War I, the chemical industry has made remarkable progress, due in a very important measure to the friendly attitude of the government toward research. Granted a continuation of this attitude, organized research will go on creating new products, for what remains to be done is far greater than anything that has been accomplished in the past."

Rubber Test Methods Altered

EMERGENCY alternate provisions for four tests for rubber insulation have been approved by the American Society for Testing Materials through Committee D-11 on Rubber and Rubber Products. In D574-40T, Tentative Specifications for Insulated Wire and Cable: Ozone-Resistant Type Insulation, the requirement for elongation at rupture after 168 hours' air oven test has been reduced from 200 to 150%. An emergency horizontal flame test has been substituted for the flame test previously used in the following: D470-41, Methods of Testing Rubber Insulated Wire and Cable; D754-43T, Tentative Specifications for Insulated Wire and Cable: Heat-Resisting Synthetic Rubber Compound; and D755-44T, Tentative Specifications for Insulated Wire and Cable: Performance Synthetic Rubber Compound. The new flame test is in line with the emergency Underwriters' requirements.

Dinsmore Talks on "Future Prospects in Rubber"

IN A talk before the Society of Security Analysts in New York on December 20, 1944, R. P. Dinsmore, vice president of the Goodyear Tire & Rubber Co., Akron, O., viewed the rubber situation along the same lines as he did in a similar talk in May 1944. He said that in May it was assumed that the war would be completely over by the end of 1946 and that the European war would be over about the middle of 1945, and it was now believed that these assumptions were still as good as any. It seems extremely probable that rubber goods production both during the war and for some time afterward will be diminished by reason of the recalcitrance of labor, as evidenced by strikes, sit-downs, slow-downs, and insistence on raising the already high wage levels. This is an important consideration in view of the fact that present and potential demands for rubber products would seem to require capacity output, Dr. Dinsmore declared.

Nevertheless, since potential demand is modified by ability to buy, it is considered necessary to modify the figures for future rubber consumption to conform more nearly to probable capacity to absorb, it was pointed out. Referring to the previously mentioned plantation production capacity just before Pearl Harbor of 1,600,000 long tons a year and the capacity for synthetic rubber production in the United States of 1,075,000 long tons a year, 46,000 tons for Canada, 36,000 tons (in 1946) for England, and 200,000 tons for the rest of the world, a total potential postwar capacity of natural and synthetic rubber of 2,957,000 long tons was estimated. This was compared with the highest world consumption of rubber of 1,104,000 tons and this country's highest consumption of 783,000 tons in 1941. Projected figures for rubber consumption for 1944-50, as compared with what is called normal line average consumption, suggest that the United States will be back to normal balance by the end of 1950, using 750,000 tons a year, but that the rest of the world will not counterbalance sub-normal consumption even by 1950, leaving it 1,138,000 tons sub-normal. If military uses are deducted, by 1950 the United States will still be 1,500,000 tons sub-normal, and the rest of the world will be 2,650,000 tons sub-normal. Table 1 below gives estimated rubber consumption for the years 1945 through 1950.

With respect to the availability of rubber, with special reference to the plantation situation, Dr. Dinsmore expects that after complete repossession, the first year will not deliver to users more than 420,000 tons and the second year not more than 825,000 tons. It may require two more years to reach 1,500,000 tons a year output. Estimated crude rubber distribution is listed in Table 2 below.

The United States capacity for synthetic rubber production is established, but may be subject to some fluctuations because of variation in demand for petroleum feed stocks used for part of butadiene supply, it was stated. After the war it may not be feasible and will certainly not be economical to continue indefinitely the use of high-cost grain alcohol and certain motor-fuel cracking plants as sources of butadiene. Sixty or 65% of our plant capacity is considered capable of producing low-cost rubber. Canada, although using petroleum stocks somewhat more expensive than the cheaper U. S. supplies, should be able to produce economically, but there seems no very good reason for producing synthetic rubber in England, and its costs there must be high. The production in Italy, Germany, and Russia is almost certain to be non-competitive in cost, but may be continued for nationalistic or reparation reasons.

If all of the foreign synthetic capacity is used, there will be an excess of crude near the end of 1948. In 1949 there will be an excess practically equal to the production of foreign synthetic. If crude does not then displace foreign synthetic, natural rubber will be in direct competition with low-cost American synthetic. Rubber balance for the years 1944-50, as given by Dr. Dinsmore, is shown in Table 3 below.

While admitting that GR-S probably costs between 30 and 40¢ a pound at present, Dr. Dinsmore estimates that it might be sold at a profit for 13¾¢ in the postwar period. The competitive quality of synthetic rubber has every opportunity for improvement in the hands of a progressive technical industry, and increased processing costs of synthetic rubber in the rubber goods factories are being reduced, and therefore its cost should soon be competitive with the cost of natural rubber. In conclusion, Dr. Dinsmore said that the future of the rubber industry appears as bright as any that can be mentioned and far above the average. This is said despite the conservative modifications of last May's figures referred to at the beginning of the talk, it was added.

TABLE 1. RUBBER CONSUMPTION—LONG TONS

	1945	1946	1947	1948	1949	1950
Tire products	582,000	647,000	679,000	644,000	560,000	525,000
Non-tire products	249,000	277,000	275,000	265,000	240,000	225,000
Total U. S. A.	831,000	924,000	954,000	909,000	800,000	750,000
Rest of world	380,000	450,000	570,000	650,000	700,000	750,000
Total	1,211,000	1,374,000	1,524,000	1,559,000	1,500,000	1,500,000

TABLE 2. ESTIMATED CRUDE RUBBER DISTRIBUTION—LONG TONS

	1945	1946	1947	1948	1949	1950
United States	100,000	100,000	210,000	400,000	400,000	400,000
Rest of world	135,000	135,000	270,000	425,000	700,000	1,100,000

TABLE 3. RUBBER BALANCE—LONG TONS

	1945	1946	1947	1948	1949	1950
Demand						
U. S. consumption	831,000	924,000	954,000	909,000	800,000	750,000
Rest of world	380,000	450,000	570,000	650,000	700,000	750,000
Total consumption	1,211,000	1,374,000	1,524,000	1,559,000	1,500,000	1,500,000
Supply						
Crude rubber receipts	235,000	235,000	420,000	825,000	1,100,000	1,500,000
Foreign synthetic production	121,000	182,000	217,000	257,000	287,000	287,000
U. S. synthetic production	855,000	957,000	887,000	509,000	400,989	498,789
Total supply	1,211,000	1,374,000	1,524,000	1,591,000	1,787,000	2,137,000

SAE Holds Annual Meeting

THE Society of Automotive Engineers held its annual meeting January 8 to 12 at the Book-Cadillac Hotel, Detroit, Mich. Among the many papers presented those of interest to the rubber industry were: "SAE Rubber Classification and Its Uses" by W. J. McCortney, Chrysler Corp.; "Synthetic Rubber in Automotive Chassis — Status and Future Possibilities," E. F. Riesing, Firestone Industrial Products Co.; and "Bonded Rubber Torsional Vibration Dampers for Diesel Engines" T. H. Pierce, H. A. King Co.

Mr. Pierce discussed the design of bonded rubber dampers and cited examples of various diesel installations and the results obtained. A properly designed damper, when added to the elastic system, will work in combination with the crankshaft to dampen the torsional vibration periods, Mr. Pierce said, and added that in the calculation and design of bonded rubber torsional vibration dampers the relation of the rubber modulus, hysteresis, and frequency must be in the proportion to the natural frequency of the reciprocating parts in the elastic system of the power plant for which the damper is designed. The natural frequency of the bonded rubber torsional vibration dampers will vary from 65 to 85% of the crankshaft frequency. The moment of inertia in the damper will vary from one-quarter to one-sixth of the effective inertia of the system, he continued, and pointed out that bonded rubber torsional vibration dampers will usually outlive the power plants.

Successful operation of such dampers, Mr. Pierce stated, depends upon the degree and uniformity of the inherent quality of the crude rubber compound used. The function of the damper depends upon the hysteresis of the rubber element. Therefore its ability to withstand abuse in service must be reliable, the engineer declared.

"Relative movement between the metal members of the damper will impose proportionate stress upon the rubber element. This movement is controlled by the inherent resilience and damping characteristics of the rubber compound. The loading of the rubber is in proportion to the movement of the oscillating damper member, and will vary while in operation with respect to the amplitude of the torsional periods in the operating range of the engine.

"To control such torsional periods the damper must be tuned to the critical frequency. It therefore is essential that the physical properties of the rubber element in the damper be held constant."

Mr. Pierce further said that it is customary to allocate the highest-grade plantation rubber available for formulating the compounds for dampers in order to obtain the best rubber compound possible having the behavior and qualities essential to damper life. Natural rubber, he told the group, is much more adaptable in its application to damper service than synthetic rubber.

"While the study of synthetic rubber application to damper service is an extremely interesting problem, the actual application of synthetics is as yet quite limited.

"The bonded rubber damper is one case in which the art of making and handling synthetic rubber has not progressed to the stage that would justify its full adoption. Much thought is being given this subject, and many experiments and tests are under way. The properties peculiar to synthetic

rubber may require that design changes be made in order to successfully adapt the available synthetics for damper service. New modifications of synthetics or processing procedures may also favor the adaptation. Either possibility involves time and considerable research. The final success in adapting synthetic rubber to this critical and exacting use will be a prominent milestone in the progress of man-made rubber," he concluded.

Mr. Riesing's address, which will be printed in an early issue of INDIA RUBBER WORLD, is briefly reported upon in the announcement of the meeting of the Metropolitan Section of the American Society of Mechanical Engineers in this issue.

J. M. Crawford, chief engineer, Chevrolet Division, General Motors Corp., was elected SAE president for 1945. He succeeds W. S. James, chief engineer, The Studebaker Corp.

High Polymer Research Bureau Formed at Brooklyn Polytechnic

ORGANIZATION of a separate division of polymer chemistry under the direction of Prof. Herman F. Mark was announced January 28 by the Polytechnic Institute of Brooklyn, following action by the Institute providing for the esetablishment of a High Polymer Research Bureau. With this move Polytechnic becomes the first educational institution in the United States to set up a complete division for polymer chemistry.

The new bureau, according to President Harry S. Rogers, was formed to set up a vigorous organization under strong leadership for the purpose of bringing the fundamental knowledge of the chemistry of high polymers up to the present empirical knowledge of plastics technology. For the chemist who plans to enter the plastics industry, or who already is in it, the bureau will be a center for information as well as a center for advanced study and research.

Within the past several months the research facilities have been rounded out with the invention of two new instruments designed by Paul M. Doty, research associate and instructor in physical chemistry, which employ the light scattering principle to determine the weight of molecules and to provide the first direct means of determining the shape of molecules. Another new installation is a laboratory equipped with an air-driven ultra-centrifuge of the latest design, Tiselius apparatus for electrophoretic studies, and other instruments heretofore used chiefly in biochemical research. This latter laboratory is under the direction of Dr. Kurt G. Stern, known for his contributions to enzyme chemistry.

Dr. Mark's group, which is carrying a dual program of research and teaching, also includes the following leading scientists: Dr. I. Fankuchen, adjunct professor of crystal chemistry at Polytechnic and consultant to several corporations on X-ray diffraction problems; Dr. William P. Hohenstein, research associate at Polytechnic; Dr. Arthur Tobolsky, of Princeton University, a part-time instructor in physical chemistry at Polytechnic; Dr. Turner Alfrey, research associate on the Quartermaster Corps project on coated fabrics at Polytechnic Institute and research chemist for Monsanto Chemical Co., plastics division, Springfield, Mass.; and Dr. Elliott Montrell, previously with Princeton and Yale universities. Drs. Alfrey and Montrell act as visiting lecturers.

Rubber Division Cancels Spring Meeting

The chairman of the Division of Rubber Chemistry, A. C. S., W. A. Gibbons, United States Rubber Co., New York 20, N. Y., on January 19 made the following announcement: "The executive committee of the Division of Rubber Chemistry of the American Chemical Society has decided not to hold the customary Spring Meeting of the Division."

Rubber Reserve Circular 37

THE Rubber Reserve Co. on December 29, 1944, issued Circular No. 37, "Distribution of Special Grades of GR-S and GR-S Black Plant Clean-Up Material: Gaging, Sampling, and Weighing of Tank Car Shipments of GR-S Latex." As of January 1, 1945, new standard specifications for GR-S became effective, and as of the same date the following special grades of GR-S produced in certain government-owned copolymer plants operated for the account of Rubber Reserve Co. became available for limited distribution to manufacturing companies. Such special grades have been assigned the following GR-S designations and are of the same type as standard GR-S except as indicated:

GRADE	DESCRIPTION
GR-S-AC	Has a Mooney viscosity between 45 and 55, but is slower curing than standard GR-S. It is manufactured by alum coagulation of GR-S latex Type 1 instead of by salt-acid coagulation as is Standard GR-S.
GR-S-10	Has a Mooney viscosity between 55 and 65, is slower curing than standard GR-S, and contains a rosin acid derivative in place of fatty acid.
GR-S-12AC	Has a Mooney viscosity between 65 and 75 and is manufactured by alum coagulation of GR-S latex.
GR-S-20AC	Has a Mooney viscosity between 39 and 45 and is manufactured by alum coagulation of the GR-S latex.
GR-S-33	Is similar to standard GR-S, except that it is manufactured by a continuous process instead of by a batch process.
GR-S-50	Is the same as standard GR-S in which "Stalite" is the stabilizer and was formerly designated GR-S-ST.
GR-S-85	Has a Mooney viscosity between 90 and 110 and a considerably higher modulus and lower elongation than standard GR-S.
GR-S-Black 1	Is a mixture of 100 parts standard GR-S with 50 parts of an easy processing channel black.
GR-S-Black 1AC	Is a mixture of 100 parts GR-S-AC with 50 parts of an easy processing channel black and is slower curing than GR-S-Black 1.

The above supersedes the provisions of Paragraph 1 of Circular No. 28 on special grades of GR-S heretofore produced and is supplemental to Paragraph 2 of Circular No. 30 relative to special grades of GR-S containing carbon black. The same distribution prices of 18½¢ a pound for special grades of GR-S alone, and 14¾¢ a pound for special grades of GR-S Black still prevails.

GR-S BLACK PLANT CLEAN-UP MATERIAL. Reference is made to Paragraph 6 of Circular No. 30 which established a price of 16.65¢ a pound for GR-S plant clean-up material. Accordingly, Rubber Reserve will sell GR-S Black plant clean-up material at a price of 13.28¢ a pound (representing a 10% reduction in the established price of 14.75¢ a pound for standard GR-S Black-1).

GAGING, SAMPLING, AND WEIGHING TANK CAR SHIPMENTS OF GR-S LATEX. Reference is made to Paragraph 7 of Circular No. 25 which pertains to adjustments for off-quality with respect to GR-S latex distributed and sold by Rubber Reserve in tank car lots. Rubber Reserve has now promulgated its "Specifications for GR-S Latices," effective January 1, 1945, which prescribes specific methods for gaging of tank cars, for sampling, and for determination of the weight of the total dry latex solids in tank cars. Accordingly, effective as of January 1, 1945, all adjustments for off-weight and off-quality of GR-S latices distributed and sold by Rubber Reserve Co. in tank car lots under Circular No. 25 shall be on the basis of the aforesaid "Specification for GR-S Latices," including the methods therein prescribed for gaging, sampling, and determining the weight of total dry latex solids.

A.S.M.E. to Hear Riesing

THE Rubber and Plastics Division of the Metropolitan Section, American Society of Mechanical Engineers, will meet February 19 at 7:30 p.m. at the Engineering Societies' Bldg., 29 W. 39th St., New York, N. Y. E. W. Riesing, chief automotive engineer, Firestone Industrial Products Co., Detroit, Mich., will speak on "Synthetic Rubber in Automotive Chassis—Status and Future Possibilities." The illustrations used by Mr. Riesing will be drawn from automotive engineering, but the principles to be illustrated are applicable to the full range of mechanical engineering. Applications of synthetic rubber to axle bumpers, motor mounts, seat cushions, radiator hose, ignition cable jackets, and other parts will be featured. An extensive array of dynamic tests and models will be operated on the platform in conjunction with the talk. Mr. Riesing has previously presented the paper before the Society of Automotive Engineers at its Detroit meeting, January 8. The A.S.M.E. meeting is in charge of J. W. Devorss, Jr., new products division, United States Rubber Co. Admission is free.

Blake Discusses Synthetics

THE meeting of the Northeastern Section of the American Chemical Society at Brown University, Providence, R. I., January 12, was addressed by John T. Blake, director of research, Simplex Wire & Cable Co., Cambridge, Mass. Speaking on "The Past, Present, and Future of Synthetic Rubber," he discussed the advantages and disadvantages of the more widely used synthetics. Slides graphically comparing GR-S and Butyl with natural rubber were shown. Concerning the future of synthetic rubber, Dr. Blake said that the backlog of civilian demands would necessitate the production of GR-S for four or five years after the war, which time will be required to put plantations into efficient operation. He predicted advances in both the economics of synthetic rubber production and technical improvement of the product. He suggested future production costs of 9¢ a pound for butadiene from alcohol and 6.4¢ for butadiene from petroleum and 5¢ a pound for styrene. These reductions plus others in equipment maintenance will result in GR-S for 12 to 15¢, Dr. Blake declared, a price directly competitive with natural rubber.

Philadelphia Forms Rubber Group

AN ORGANIZATION meeting was held on January 10 to form the Philadelphia Rubber Group. Representatives of some 20 interested companies were present from this and adjoining areas. After an evening of discussion officers were appointed to carry out the activities until regular officers are elected by members of the Group. The present officers are: R. S. Hanslick (chairman), Quaker Rubber Corp.; W. B. Munroe (vice chairman), Linear Packing & Rubber Co.; L. H. Youse (treasurer), H. L. Gilmer Co., (United States Rubber Co.); J. A. Popp (secretary), Shell Oil Co.

The need of a Philadelphia Rubber Group had been discussed for a number of years, and it is hoped that the rubber chemists and technologists of New Jersey, Delaware, and Eastern Pennsylvania will now join the new organization. An attempt is being made to contact all companies in these areas, and if any companies are missed, they are urged to get in touch with one of the above officers.

The first dinner-meeting of the Group is scheduled for Friday evening, March 9, at the Benjamin Franklin Hotel, Philadelphia. Dinner will be served at 7:00 o'clock. The speaker of the evening will be A. A. Somerville, of R. T. Vanderbilt Co., New York, N. Y., whose subject will be announced later.

Coe Speaks to Engineers

JOHN P. COE, general manager of the Naugatuck Chemical Division, United States Rubber Co., spoke on "Synthetic Rubber" to about 150 members and guests of the Providence Section of the American Society of Mechanical Engineers, January 2, at Providence, R. I. Barring unexpected major changes in world economics, Mr. Coe said, GR-S will be able to compete readily with plantation rubber in many applications after crude rubber producing areas are regained from the Japanese. The talk, which reviewed the past and present uses of synthetic rubber, was illustrated with products manufactured from various types of synthetic rubber and samples of the raw materials and intermediate products involved in making GR-S. A film showing the production of synthetic rubber in the plant at Institute, W. Va., was screened.

Dibasic Acid for Resins

A NEW dibasic acid, M.D.A. (dihydroxydiphenylmethane dicarboxylic acid), of interest to chemists working with alkyd and other resins and drying oils for use in making protective coatings, paints, and other products, consists of a mixture of isomers, principally the para-para. The combination of the reactive carboxylic groups with the phenolic groups in the same molecule combines the versatility of the alkyd-type resins with the chemical resistance of the phenolic types. In the laboratories of Heyden Chemical Co., which developed the product, it was found that alkyd resins made with M.D.A. and a pentaerythritol alcohol overcome the poor resistance of ordinary alkyds. When varnishes are formulated with these resins, the resulting products are said to be improved rapid-drying protective coatings.

Ontario Rubber Section Meets

ABOUT 80 members and guests attended the January 23 meeting of the Ontario Rubber Section at the University of Toronto, Toronto, Ont., Canada. Means of financing the activities of the group in the event that it should affiliate with the Chemical Institute of Canada were discussed. United States War Department films, "The Battle of Britain" and "Highballing to Victory" were shown. One sequence of the latter picture shows the tire performance of the Red Ball Express from Normandy beaches to the front lines of battle. The Firestone films, "Freedom Rides on Rubber" and "All Out for Victory," were also viewed.

Canadian Plastics Conference

THE Canadian Section, Society of the Plastics Industry, will hold its third annual conference February 6 and 7 at the Mount Royal Hotel, Montreal, P. Q. Subjects to be discussed by authoritative speakers from the United States and Canada will include new machinery developments, plastics in the plywood industry, blow molding of thermoplastics, and electronic heating in the molding process. The chairman of the committee in charge is J. D. Benedito, Canadian Resins & Chemicals, Ltd., Montreal. It includes L. C. Macleod, Monsanto (Canada) Ltd., Montreal, registrations; E. G. MacPherson, Dominion Rubber Co., Montreal, publicity; and N. A. Austin, Miner Rubber Co., Granby, P. Q., reception.

CALENDAR

Feb. 2.	**Chicago Rubber Group. Morrison Hotel, Chicago, Ill.** *Cancelled by order of ODT.*
Feb. 6.	**Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.**
Feb. 6-7.	**Society of Plastics Industry, Canadian Section, Third Annual Conference, Mt. Royal Hotel, Montreal, P. Q.**
Feb. 9.	**Rubber & Plastics Division, Montreal Section, S. C. I. Ritz-Carlton Hotel, Montreal, P. Q., Canada.**
Feb. 16.	**Akron Rubber Group. Mayflower Hotel, Akron, O.**
Feb. 26-Mar. 2.	**American Society for Testing Materials. Spring Meeting.** *Cancelled by order of ODT.*
Mar. 1.	**First National Products of Tomorrow Exposition. Chicago Coliseum, Chicago, Ill.**
Mar. 1-31.	**American Red Cross War Fund Campaign.**
Mar. 6.	**Los Angeles Rubber Group, Inc.**
Mar. 9.	**Philadelphia Rubber Group. Benjamin Franklin Hotel, Philadelphia, Pa.**
Mar. 9.	**Rubber & Plastics Division, Montreal Section, S. C. I. Ritz-Carlton Hotel, Montreal, P. Q., Canada.**
Mar. 23.	**Chicago Rubber Group, Morrison Hotel, Chicago, Ill.**
Apr. 3.	**Los Angeles Rubber Group, Inc.**
Apr. 9-10.	**Midwest Power Conference. Palmer House, Chicago.**
Apr. 13.	**Rubber & Plastics Division, Montreal Section, S. C. I. Ritz-Carlton Hotel, Montreal, P. Q., Canada.**

Montreal Group Hears J. Mark

THE Rubber and Plastics Division of the Society of Chemical Industry held a dinner-meeting January 12 at the Ritz-Carlton Hotel, Montreal, P. Q., Canada. J. G. Mark, of Dewey & Almy Chemical Co., Cambridge, Mass., addressed the group on "Tailor-Made Polymers." Dr. Mark traced the history of the development of rubber polymers and discussed adjustment of these polymers for specific applications. He pointed out that the three stages of development of a desired finished product were: (1) utilization of the natural product, (2) a modification of that product to fit more closely the desired requirements, (3) the development of synthetic products for specific purposes. Dr. Mark then went on to show how these stages had occurred in the development of rubber polymers.

A film illustrating several applications of Dewey & Almy products and the research and development facilities of the chemical company was shown. An executive meeting preceding the dinner discussed the relation of the group to the newly formed Chemical Institute of Canada.

William Woodcock, of Carbide & Carbon Chemicals Corp., New York, N. Y., will speak on "Plasticizers" at a dinner-meeting of the group February 9.

"Thiokol" Molding Powder MP 610

A NEW series of "Thiokol" synthetic rubber molding powders which become vulcanized at 300 to 360° F. recently was developed. The resultant tough elastic resilient solid possesses the physical properties of vulcanized rubber and in addition has reportedly excellent resistance to solvents, greases, oils, fuels, sunlight, ozone, and atmospheric oxidation. The compounds remain flexible at temperatures below —50° F. and are serviceable at those in excess of 220° F. A wide range of mechanical goods such as washers, valve seat disks, grommets, gaskets, diaphragms and other molded parts for the aviation, marine, and automotive industries can be molded from "Thiokol" molding powder MP 610 and others in the series.

The properties of the finished compounds can be varied over a wide range of hardness through compounding. The compounds are black in color since the best properties are developed through the use of carbon black as a reenforcing pigment. The physical properties of the compounds are within the range normally considered satisfactory for most rubber mechanical goods applications. The specific gravity of "Thiokol" molding powder MP 610 is 1.48; the bulk factor is 3.00; the molding time three to 10 minutes; the weight 0.86-ounce per cubic inch; and the shrinkage 0.020-inch per inch. Molds used for other plastic molding materials are suitable for "Thiokol" molding powders. The pressure required to mold a properly heated powder is about 1,000 pounds per square inch calculated on the area of the molded piece. The Thiokol Corp., Trenton, N. J., which makes the molding powders, suggests that the molding of them be confined to conventional plunger-type molds.

Compounding Ingredients Price Changes

Dutrex 6	lb.	$0.025 / $0.375
Marmix	gal.	1.75 / 2.00
Piccovol	lb.	.02 / .025

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UNITED STATES

New Tire Plant Construction Program; Second International Rubber Conference Held

The Army's campaign for continuous operation of the tire plants for 120 days, seven days a week, got under way between January 1 and 15 in various parts of the country, and more details of the tire industry's and WPB's expansion programs to increase the annual production rate of heavy-duty and jeep tires from 16,000,000 to 28,000,000 by early 1946 became known during January. Congressman W. R. Poage of Texas, of the special sub-committee of the House Committee on Agriculture, submitted a report to Congress on January 2 on the "Study of Rubber in United States, Mexico, and Haiti," which reviewed the guayule rubber project and other minor rubber projects in considerable detail. Manpower and labor problems continued to be of much concern. Drew Pearson, Washington columnist, criticized War Mobilization and Reconversion Director Byrnes and the rubber industry for maintaining premium prices on passenger-car tires until April 15, 1945, and the second meeting of the "Rubber Study Group" of the Netherlands, the United Kingdom, and the United States was held in Washington from January 22 to 29.

Tire Program Developments Numerous

Developments in the program to increase the production of truck and bus tires from the present output of about 16,000,000 units a year to about 28,000,000 units followed each other rapidly during the past month. Following the announcement on November 27, 1944, that currently available or soon to be completed facilities could produce about 4,000,000 additional units a year if the necessary manpower and materials were furnished, a new tire plant construction program at first rated at 4,000,000 more units a year and then raised to 6,000,000 was approved by the War Production Board. The cost of this plant expansion program which will require almost a year to complete is now estimated at about $70,000,000, and it will be financed by the Defense Plants Corp.

Late in December the WPB cut civilian tire production schedules by 37% in order to permit an increase of 350,000 units per quarter in the critical A-5, small 8-ply and under tires for military use.

Lt. Gen. B. Somervell, of the U. S. Army Service Forces, telegraphed the heads of all the tire manufacturing companies and Sherman Dalrymple, president of the United Rubber Workers (CIO), just before the first of the year an urgent appeal for greater tire and tube production during the first 120 days of 1945. The text of General Somervell's wire follows:

"Because of the critical shortage of military tires and the urgent need for every possible manhour of tire production, both labor and management of tire industry have resolved to cooperate on a campaign of continuous operation for 120 days, 7 days a week, beginning January 1, 1945. An official certificate of commendation will be presented by the War Department to all workers who have perfect attendance records and are present on every working day until April 30. Our fighting men have a right to expect that in this critical period we will all stay on the job and work, not wait for Victory."

Owing to bad weather conditions in some parts of the country, this campaign was not started until January 15 by some companies. It was left up to the companies to start the campaign on any day between January 1 and 15, as long as they continued it for the full 120 days. In Akron the campaign was officially begun on January 15.

Material Needs for November 27 Estimate

Materials needed to produce tires and tubes in accordance with the estimates submitted by the tire industry on November 27, and for other rubber goods, were made public December 29 by J. A. Krug, WPB chairman. The first quarter needs in synthetic rubber can be met with existing facilities except in the case of Butyl rubber. The natural rubber requirements for the first quarter will total 36,400 long tons. The inadequate supply of EPC and HMF carbon blacks will have to be balanced by the use of less desirable furnace blacks. The rayon industry will fall short of meeting essential needs for high-tenacity rayon cord in the first quarter of 1945 by 19,100,000 pounds. Plans are being made to expand production in subsequent quarters. Because cotton tire cord will have to be substituted to cover the deficiency of rayon cord on a poundage ratio of 1.3 to 1, cotton cord needs for tires will amount to 57,700,000 pounds for the first quarter of 1945. Since this demand runs head-on into the military demand for duck for use in tentage and heavy canvas tarpaulins, detailed allocations of tire cord and duck will be made at a future date, based on the relative essentiality of truck tires in comparison with tentage.

Material needs for the first quarter of 1945 are given below, together with figures on consumption in the third quarter of 1944.

MATERIAL CONSUMPTION—LONG TONS

	1st Quarter 1945 Estimated	3rd Quarter 1944 Actual
Synthetic Rubber		
Buna S (GR-S)	163,000	152,467
Neoprene (GR-M)*	14,600	12,196
Butyl (GR-I)	11,500	3,329
Buna N (GR-A)*	3,400	3,554
Total Synthetic	192,500	171,546
Natural Rubber	36,400	32,883
Reclaimed Rubber	51,200	56,141
All Rubbers	280,100	260,570

* Not used in manufacture of tires and tubes.

	(Millions of Pounds)	
Carbon Black		
Channel	133,000	107,235
Furnace	101,480	84,354
Total	234,480	191,589
Tire Cord and Fabric		
Rayon	48.6*	24.4
Cotton	57.7	47.1
Total	106.3	71.5

* Maximum estimated production capacity of the rayon industry.

On January 1, Army and WPB officials decided to divert cotton fabric from other production programs to tire manufacture because of the extreme urgency of the latter. The Firestone Tire & Rubber Co. was the first rubber company granted relief from the WPB Textile Bureau's directive requiring diversion of 20% of its production to cotton duck for tents and other uses, and other companies operating textile mills will probably receive the same help. At about the same time it was announced that the Army will furlough 1,000 soldiers for work in textile mills to help ease the fabric shortage.

Closer control will be exercised over allocation and use of carbon black in view of increased requirements for this material for use in heavy-duty tire production, the WPB announced January 10. Beginning with requests for February allocations, the terms of Order M-300, Schedule 32, which established allocation control over carbon black, must be complied with strictly. Specifically, the war and civilian code numbers designated opposite the end use classifications in paragraph (e) of the order must be given, showing the quantities of carbon black required for each such code number designation. Failure to comply with any of the terms of the order in preparing applications will result in return of the forms to applicants without action, WPB warned.

Plans are being formulated by the WPB to increase the output of channel black by 175,000,000 pounds a year, it was also announced January 11. Production of channel black during 1944 averaged 35,000,000 pounds a month. No substantial increase will be possible, however, until the latter part of 1945 or early 1946 since it will be necessary to construct new facilities. Carbon black manufacturers have increased production of channel black by at least 175,000,000 pounds a year since 1941, but the increase in the heavy-duty tire program necessitates raising channel black output by another 175,000,000 pounds. About 375,000,000 cubic feet of natural gas a day will be required for the higher production. It is expected that a number of plants will be built by the government in the Southwest. Sufficient manpower will also have to be found to operate these new plants.

Manpower and Labor Problems

Manpower and labor problems in connection with the tire production program also occupied much attention. C. V. Wheeler, president of the Goodyear local, United Rubber Workers, of Akron, filed a complaint late in December with General Somervell, Mr. Krug, and J. F. Clark, of the WPB, and Mr. Dalrymple in which he charged that Goodyear's Plant 2 could produce 5,000 more tires daily with better material supply and scheduling. Goodyear management in reply stated that it would welcome an inquiry into the subject by a fair and competent authority and added:

"We would suggest, too, that the scope of such inquiry be broadened to include the degree of responsibility Wheeler should assume for the parade of sitdowns, slowdowns, and work stoppages which, in the month of November alone, lost more than 15,000 man-hours of production and a large number of military tires."

According to the *Akron Beacon Journal* of January 21, the Army cleared the Goodyear company of any mismanagement in a report made by Col. Kenneth D. Johnson, chief of the Army's special truck tire man-

power project team in Akron. Colonel Johnson's report on Mr. Wheeler's charges followed a long union-management hearing at which both union and company officials were questioned by the colonel. The report declared Wheeler's charges to be unfounded and in addition said that:

"The opinions of duly elected local union officers should be withheld from public expression until they have some chance of being factually supported. They should have no public expression when the purpose is solely one of propaganda."

Colonel Johnson also reported that: (1) Goodyear local representatives presented no evidence to support Mr. Wheeler's contention that Plant 2 could produce 5,000 more tires daily. (2) Statements made by W. H. Tidrich, vice president of the local union, "were in direct conflict with the opinion expressed by Mr. Wheeler," and "completely disavowed Mr. Wheeler's contention and conclusions." (3) "The morale and patriotic sincerity of the vast bulk of the workers in this plant in the existing crisis—of which there can be no dispute—is in no way aided by the public expression of a loose and unwarranted opinion of a local labor leader."

"To contend, as Mr. Wheeler did in the hearing," the report states, "that Plant 2 could produce 5,000 more truck tires daily without additional manpower and machines is on its face absurd. . . . Every reasonable step is being taken by the company to attain its peak truck tire capacity in Plant 2, which on the basis of evidence presented is considered to be from 3 to 8% in excess of current output."

General Supt. L. Tomkinson said in the hearing that Plant 2 was operating within 3% of capacity, which he considered "fair," adding that: "With the exception of absenteeism and breakdowns we're getting out every possible tire we can of military size with the equipment we have."

In unprecedented action the NWLB on January 17 ordered the United States Rubber Co. in Detroit to deduct fines of $12.50 from the wages of 572 union members who participated in a wildcat strike at this company's tire plant last October. When about 800 wildcat strikers defied Mr. Dalrymple's back-to-work order, he levied the fines and set a deadline for payment. When the deadline arrived, the 572 had not paid and were automatically expelled from the union. Under the maintenance of the membership clause that meant that the company was obligated to discharge these 572 workers, but faced with a labor shortage and mounting military tire requirements, the company appealed to the NWLB for a solution.

It was announced in Akron late in January that URW Counsel G. L. Patterson will go to Washington in the near future to lodge an industry-wide wage appeal with the NWLB for those workers the union represents. The URW is asking for a 12¢ general wage increase, a 10¢ hourly night bonus for work done between 6:00 p.m. and 6:00 a.m., paid lunch periods, and liberalized vacation clauses. The union's request for the 12¢ general increase is part of the general attack by the CIO and AFL unions on the Little Steel formula.

The Cleveland regional WLB announced during the week of January 15 that it would approve night bonuses up to 5¢ an hour except in rare cases, and this decision gave the URW another argument for an industry-wide night bonus.

The first soldiers furloughed to help produce heavy-duty tires began to arrive at the various plants late in December and during January. Reports from Akron, New England, and the West Coast confirmed the arrival of the first contingents of soldiers, varying in numbers from a few dozen to a few hundred. They will receive regular union wages, but will not be required to join any union, and will be subject to military authority while working in their civilian capacities. Their Army allotment checks will continue.

Drew Pearson Charges

In his column for January 8, Drew Pearson criticized Mr. Byrnes and the tire manufacturers for maintaining a premium on civilian passenger-tire prices granted by the OPA in April, 1944, instead of permitting a price roll-back scheduled for December 15, 1944. Mr. Pearson cited numerous figures which he said were 1943 profits before taxes of Goodrich, Goodyear, Firestone, and U. S. Rubber and gross profits for the entire rubber industry for 1943 and for six months of 1944, and compared them with average 1936-39 profits, to prove that the 120-day extension granted by Mr. Byrnes on these passenger-car tire prices was not justified. Rubber industry executives refused to get "into a brawl" with Mr. Pearson over the figures he cited and said that any reply to the columnist should come from Mr. Byrnes. Chief reason for not attacking Pearson's profit figures, industry spokesmen said, was that they did not know where he started his compilation and whether he included or excluded the substantial amounts covered in renegotiation of war contracts. They also pointed out that taking total profits of the rubber industry as a basis for charging that civilian tire prices are out of line was "obviously unfair" as all rubber companies are engaged in scores of other war activities, such as making airplanes and parts, ammunition, guns, and other equipment.

New Tire Plant Construction Program

Mr. Krug on January 3 announced that an Army Air Forces factory at Pottstown, Pa., ideally suited for the production of tires has been released to the Firestone company for that purpose. This will save much construction time in getting new machinery into production. The plant is expected to be in production April 1, turning out 3,000 heavy-duty tires a day. A later announcement on January 20 by Jesse Jones, Secretary of Commerce, stated that the acquisition of machinery and equipment for this plant would cost about $7,000,000 and that title would remain with the DPC.

In this same announcement by Mr. Jones the acquisition of equipment for the construction of plant facilities at Tuscaloosa, Ala., for the production of military tires and tubes, at a cost of approximately $18,000,000, was also reported. The B. F. Goodrich Co. will operate these facilities; title will remain in the DPC. It is understood that this plant will employ between twelve and fifteen hundred people, and that production is expected to begin in September. Other plants to be constructed in the same manner were: A $10,000,000 plant at Nashville, Tenn., to be operated by Goodyear; a plant costing $250,000 at Memphis, Tenn., and one at Akron costing $1,000,000, both to be operated by Firestone; a plant at Dayton, O., to cost $400,000 and to be operated by the Dayton Rubber Mfg. Co., and a plant at Akron, to cost about $500,000 and to be operated by Goodyear.

Mr. Krug in his announcement early in January said that the WPB had asked for 20,000 more tires daily and that the industry had replied that with the expansion program it could raise the figure to 36,000 daily, but WPB reduced the industry figure to 21,300. Of the 21,300, Firestone, Goodyear, and U. S. Rubber will add 3,000 each, and Goodrich 2,000. Smaller companies will make up the balance. The program also will add 27,500 more tubes daily, it was said.

There was some pessimism evident in the industry as to how much longer than a year it will take to get production from this new expansion program up to the 6,000,000 annual rate. No one argued against the Army's decision that the tires will be needed, but the length of time it has taken to get tires from the $72,000,000 expansion program initiated in September, 1943, is one reason for searching for an easier way to produce the needed tires. The four major units in this 1943 program were new plants by Goodrich at Miami, Okla.; Goodyear at Topeka, Kan.; Firestone at Des Moines, Iowa; and General Tire at Waco, Tex. The Goodrich plant is just getting under way; the General plant has had an opening, but still is not making tires, and the Firestone and Goodyear plants, construction of which was started later than the other two, are quite a long way from being in production.

House Committee Report on Rubber

Congressman Poage, who has been active in support of the continued production of guayule rubber in the United States, submitted a report to Congress on January 2 on the "Study of Rubber in United States, Mexico, and Haiti." Some parts of this report are similar to that presented in the January, 1944, INDIA RUBBER WORLD[1] in an article on "Guayule Rubber Production by the Emergency Rubber Project," but in addition considerable new information and some interesting conclusions and recommendations are presented.

Under "Conclusions" the committee submitted a five-point program comprising: (1) a recommendation that the federal government continue a comprehensive program of research and experimentation to determine the full possibilities of culture, processing, use, and development of guayule; (2) a recommendation that the government disassociate itself from the production and processing of guayule for any but experimental purposes just as soon as reasonable arrangements can be made with private interests to purchase and use the existing plantings of guayule; (3) a recommendation that so long as the war continues and the sources of natural rubber from the Far East are not available, no existing planting of guayule rubber should be destroyed; (4) a recommendation that in order to establish a sound postwar industry in private hands, the government must establish and guarantee for a period of from seven to ten years a definite floor under the price of domestically produced guayule rubber; a price of between 20 and 30¢ a pound of rubber content was suggested; (5) a further recommendation that Congress continue interest in and close scrutiny of the entire rubber production program through an appropriate select committee. The committee said that although it was not empowered to investigate the production of synthetic rubber, it felt that all sources of rubber must in the long run be considered together and that in recommend-

[1] Pp. 363-66, 370.

ing the continued study it would suggest that the study include not only an appraisal of our war needs, but that it give consideration as well to the long-time needs of agriculture.

It was stated in the main body of the report that the 31,356 acres of guayule plantations now established, together with the experimental plantations and shrub on lands used originally as nurseries, represent an estimated potential supply of approximately 26,000 long tons of rubber, assuming that the shrub can be harvested and milled in an orderly and economical manner under a program beginning December, 1944, and continuing to June, 1950. It was estimated that about $19,000,000 would be required subsequent to July 1, 1945, to maintain these plantations, mill out the rubber in the most economical manner, conduct research from which results would benefit the immediate program, and completely liquidate the project. The estimate of potential production of 26,000 tons is not based on maximum potential production of rubber per acre, but on the most economic production of rubber from the planted shrub as estimated in the light of present knowledge of guayule growth, and best planned utilization of extraction plants, which plan involves the construction of two new mills after July 1, 1945.

In 1944 was completed the harvesting of native guayule shrub growing wild in the Big Bend area of Texas. This work, financed entirely by Rubber Reserve Co., produced 225½ long tons of rubber from 2,420 tons of shrub at a total cost of $336,470.88, or 66½¢ per pound.

Since July, 1944, special emphasis has been directed toward preparation for the extraction of rubber from the shrub planted in 1942. The old Salinas, Calif., mill has been improved and resumed operations early in December, 1944. A new mill at Bakersfield, Calif., now under construction, will begin operating in March, 1945. About 600 tons of rubber will be produced by these two mills by July, 1945. The production capacity of these mills in the fiscal year 1946 is estimated at approximately 2,100 tons of rubber. The report states that two of the larger rubber manufacturing companies continue their interest in the operation of the guayule mill now under construction in Bakersfield, and may make definite proposals for the lease or fee operation of this plant after the shakedown run of the mill has demonstrated the success of several new methods of handling the shrub which have been included in its design. Research and experience have made possible the recovery of 90% or more of rubber from the shrub; while formerly only 65 or 75% of the rubber was recovered in the mill at Salinas. Mention is made of the fact that young shrub is far more difficult to handle before and during processing than the old shrub for which a processing method,[2] while not entirely satisfactory, had been developed, and on which most of the information available in 1942 had been based. Studies of the complicated problem of retting[3] large quantities of young shrub have developed the possibilities of a brief, but effective retting of shallow layers of cut shrub. Studies are also being conducted to evaluate the cost of processing the shrub with the Jordan-type paper mill as a substitute for the pebble milling.

Mention is also made of tests recently completed by Goodrich on experimental lots of resinous and deresinated California guayule rubber as a 100% replacement for *Hevea* rubber in the outer plies of large heavy-duty tires and whether guayule would serve as a cement between the GR-S plies to secure building tack. These tests were confined to heavy-duty 9x20-inch tires in which Standard GR-S rubber was used in the tread and sidewalls, the carcass plies, and in the ply under the tread. In laboratory tests the tires were run to blow-out failure, which occurred in every case in the GR-S plies. In road tests, although failure from smooth tread, tread cracks, ply failure, etc., were recorded, in no case was there failure in the guayule plies Nos. 9 and 10. Both resinous and deresinated guayule appeared to give equal performance. Guayule as a cement was not satisfactory as a 100% replacement for *Hevea*. In conclusion the report said:

"In view of the foregoing, untreated guayule should be considered for use as a substitute for natural (*Hevea*) rubber in tire stocks. It is recommended that further testing of tires be done to substantiate this conclusion."

With regard to cooperative activities in foreign countries it is reported that indicator plots have been established in the central plateau area of Mexico and in the grasslands of the States of Durango, Zacatecas, and Guanajuato and the shrublands of the State of Nuevo Leon. Advice and assistance have been extended to Argentina, Chile, and Uruguay, and guayule seed has been provided many countries for experimental purposes. Certain countries, notably Australia, have provided the Department of Agriculture with experimental findings. Technical information on guayule culture has been supplied the Government of the Soviet Republics. Seed and information concerning the culture of *kok-saghyz* have been furnished by the Soviet Government to the United States Department of Agriculture.

Funds appropriated for carrying on all work of the Department of Agriculture's emergency rubber project in the fiscal years 1942, 1943, and 1944 amount to $45,083,000. There remained on June 30, 1944, unobligated balances from these appropriations in excess of the requirements up to June 30, 1945, and no new funds were appropriated for the fiscal year 1945. Expenditures for the fiscal years 1942, 1943, and 1944 and estimated obligations for the fiscal year 1945 total approximately $37,700,000 for the guayule program.

Programs with Minor Rubber Producing Plants

An experimental program of several hundred acres of goldenrod was carried out in the Southeast, with principal activities centered in Burke County, Ga. It was learned that extraction of the rubber from the leaves (4% to 7% of the dry weight of the leaves) could only be accomplished by a double solvent method, and on the recommendation of the Rubber Director's Office, since it was realized that only very small quantities of low-grade rubber could be produced during the emergency, the project was terminated on June 30, 1944.

The experimental program carried on by the Department of Agriculture with *kok-saghzy*, the Russian dandelion, was extended from a few indicator plantings in 1942 to about 700 acres in 1943, in the northern states from Vermont to Oregon. A relatively simple mechanical method of extracting the rubber was devised, and from the rubber produced, truck and passenger-car tires were manufactured which are now undergoing road tests. The quality of the rubber obtained from *kok-saghyz* roots is excellent, being closely comparable to *Hevea* crude rubber. Despite these facts, because it was felt that this rubber could not contribute sufficient quantities to emergency war requirements, the project was closed out June 30, 1944.

Under the emergency rubber project, small plantings of *Cryptostegia grandiflora* were made in Florida and California, and cooperative work with the Haitian Government resulted in 43,000 acres being actually planted in that country. It has been demonstrated that an excellent grade of rubber can be produced from *Cryptostegia*, but yields probably would not exceed 100 pounds of rubber per acre per year, and much hand labor would be required for harvesting. Mechanical extraction from branch and whip cuttings is promising and should result in a rubber of good quality, but solvent extraction is expensive and produces a low-grade product. *Cryptostegia* shows little promise for rubber production under normal conditions, the report concludes, and could be considered for emergency rubber production only if costs were not a controlling factor and labor abundant and cheap.

Rubber Industry 1943 Accident Rates

Accident rates in the rubber industry for the calendar year 1943 are reported in a pamphlet of the National Safety Council released late in December, 1944. It is stated that safety programs conducted by rubber companies were slightly less effective in 1943 than in 1942. The average frequency rate was reduced 2%, compared with a 5% reduction for all industries, and the severity rate increased 7%; whereas the average increase for all industries was only 1%. The frequency rate (number of reportable injuries per million hours of exposure) for the rubber industry was 11.14, as compared with 14.52 for all industries, and the severity rate (number of days lost as the result of reportable injuries, per 1,000 man hours of exposure) was 0.76 and compared with 1.20 for all industries. A breakdown of injury rates by industrial groups follows:

INJURY RATES, BY INDUSTRIAL GROUPS

Industrial Group	1943 Frequency Rates		1943 Severity Rate	
	All Injuries	1942-43 Change	All Injuries	1942-43 Change
Entire industry	11.14	— 2%	0.76	— 7%
Rubber footwear	6.66	+36%	0.35	+191%
Tires and tubes	12.64	+ 5%	0.96	+ 26%
Industrial rubber goods	15.98	—20%	0.87	—17%
Not otherwise classified	8.38	+18%	0.85	—34%

Members of the N.S.C. Rubber Section reported the circumstances and causes of 83 fatalities and permanent partial disabilities as involving machinery, such as rolls and presses, in almost one-half of the injuries. Two-thirds of the accidents were caused by the use of unguarded or inadequately guarded machinery and equipment and poorly maintained or poorly designed equipment. Closer supervision of employes and further training in safe methods are necessary to reduce accidents substantially. Disobedience of instructions, haste, and other improper attitudes were factors in one-half of the accidents. The cause in most of the remaining cases was lack of knowledge, skill, and experience.

WPB Personnel Notes

Mr. Krug announced January 10 that

[2] INDIA RUBBER WORLD, Feb., 1944, pp. 475-77, 479.

[3] See pp. 570-73, this issue.

L. D. Tompkins, formerly Deputy Rubber Director, will serve as consultant to the WPB Chairman and to James F. Clark, director of the WPB Rubber Bureau, in connection with the tire expansion program. This assignment will be in addition to Mr. Tompkins' present duties with the Office of War Mobilization and Reconversion, where he is assisting in the coordination of the efforts of the several agencies responsible for the rubber production program.

Mr. Clark announced on January 20 that L. E. Spencer, of Hartville, O., has been transferred from the position of Deputy Director to that of consultant to the Rubber Bureau.

W. J. Sears, of Detroit, Mich., formerly Assistant Director of the Rubber Bureau, becomes Deputy Director. Mr. Sears has been with the WPB since October, 1942.

International Meeting in Washington

The U. S. State Department on January 17 revealed that a meeting of the Rubber Study Group of the Netherlands, the United Kingdom, and the United States had been arranged for January 22-27, inclusive, in Washington. In September, 1944, the State Department had announced that as an outgrowth of the exploratory rubber discussions held in London during August, the United States was prepared to participate in this informal arrangement designed to provide for study and discussion of rubber problems of mutual interest to the participating governments. Since that time a program of studies has been undertaken in the United States, and a similar program in London. The purpose of the January meeting was to consider and discuss the materials contained in these studies.

The United States was represented by B. F. Haley, Director, Office of Economic Affairs, Department of State. Mr. Haley had as his advisers the members of the Rubber Advisory Panel: namely, J. W. Bicknell, Rubber Development Corp.; James F. Clark, WPB Rubber Bureau; John L. Collyer, B. F. Goodrich Co.; Harvey S. Firestone, Jr., Firestone Tire & Rubber Co.; R. A. Gordon, Combined Raw Materials Board; H. Stuart Hotchkiss, Cambridge Rubber Co.; H. J. Klossner, Rubber Reserve Co.; P. W. Litchfield, Goodyear Tire & Rubber Co.; Harry E. Smith, Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc.; Herbert E. Smith, United States Rubber Co.; Gilbert K. Trimble, Midwest Rubber Reclaiming Co.; A. L. Viles, Rubber Manufacturers Association, Inc.; and R. D. Young, Rubber Trade Association of New York, Inc.

O. S. Franks was chief of the United Kingdom delegation, while P. H. Westermann headed the Netherlands group.

The Department of State emphasized that no formal agreement relating to postwar rubber had been entered into or is now contemplated. The sole purpose of the Rubber Study Group is to provide a medium through which factual studies may be made and informally discussed, it was added. A signed article by M. F. Lam, which appeared in the New York *Journal of Commerce* on December 28, 1944, also emphasized that the January meeting would be merely for the purpose of exchanging information, but did disclose for the first time that the United States had shelved a British proposal calling for the creation of an international rubber advisory committee, somewhat less formal in character, but analogous to the petroleum commission provided in the Anglo-American petroleum treaty.

A report from Washington on January 24 stated that as a result of the studies conducted by the three governments since the meeting in London in August, 1944, heavy reliance must be placed on the production of synthetic rubber in view of the shrinking stockpile of natural rubber in the face of mounting war demands. It was said that Ceylon and Latin America were producing natural rubber at about the maximum rate that could be expected. In the postwar era it has been thought that there will be a shortage of natural rubber for two or three years because of the time required to get plantations into production, manufacturing machinery operating, and shipping on regular runs.

The groups from the United Kingdom and the Netherlands will visit synthetic rubber plants in West Virginia, Kentucky, and Ohio and manufacturing plants in Akron, O., and Passaic, N. J., at the conclusion of the Washington meeting.

Year-End Statements by Rubber Co. Heads

Year-end statements by the heads of major rubber companies strongly emphasized that war production is still the No. 1 job of the rubber industry.

John W. Thomas, of Firestone, stated that: "The rubber industry, still expanding vigorously after three years of war, faces its greatest task with the beginning of the new year. This is the production of the increased quantities of heavy-duty tires made necessary by the rapid motorized movements of our fighting men. Figures on synthetic rubber usage show how far Americans have progressed with this new material," Mr. Thomas added. "In 1943, the industry used 171,000 tons of general-purpose synthetic rubber and 317,000 tons of crude rubber. In 1944, the figures were reversed. Eighty per cent., or 562,000 tons, of the rubber used by industry was synthetic rubber, while 20%, or 144,000 tons, was natural rubber. An expanding flow of war products from the nation's rubber plants thus is assured, despite the fact that our stockpile of natural rubber has sunk now to about 10% below the danger point set by the Baruch report."

Mr. Smith, of U. S. Rubber, also emphasized the war production responsibility of the industry.

"We will consume more rubber in 1945 than in any previous year," he said. "We estimate the amount to be 816,000 tons, an increase of 216,000 tons over the average prewar year, an increase of 116,000 tons over 1944, and 33,000 tons over the record year of 1941. Postwar use of rubber both in the United States and the world will be much greater than ever before. We estimate that an average of 800,000 tons a year will be consumed by the United States in the first five postwar years, and that an average of 650,000 tons will be used by foreign countries in the same period. Most of the rubber used until the war is over will be synthetic. Both synthetic and natural will be used in the postwar years. How much of each is anybody's guess. But this much is certain—the rubber supply will always be able to meet the demand."

Mr. Collyer, of Goodrich, pointed out that manpower to build material into war goods continues as the industry's main problem.

"America's war-born synthetic rubber industry emerged in 1944 as the major source of the nation's rubber supply, accounting for 80% of the year's consumption," he declared. "The rise of synthetic rubber has important implications for postwar industry. It is still impossible to forecast the 'balance of power' between synthetic and natural rubber when Far Eastern rubber again becomes available in volume, but experience in 1944 has confirmed the belief that after the war natural and synthetic rubbers will be in competition over a wide field."

An article by Mr. Collyer found elsewhere in this issue records his thinking on these lines in greater detail.

In addition to his year-end statement Mr. Litchfield, of Goodyear, issued during January the first bulletin of a series entitled, "Notes on America's Rubber Industry." This bulletin discussed "Synthetic —A Great New Factor in Our Economic Life" and stressed two basic factors that should be kept in mind in appraising the future of America's synthetic rubber industry: namely, (1) "So long as we have our own source of supply, no unfriendly nation can ever again threaten our economic or miiltary security by seizure of the strategic rubber growing areas of the world." (2) "So long as we can produce synthetic rubber at a reasonable cost per pound, no nation or cartel controlling the source of natural rubber will again be in position to gouge the American consumer." Also strongly underscored was the statement that: "The American rubber industry and the public which consumes its products can be protected against such extremes in the future provided we keep our synthetic producing facilities substantially running and all available."

Technologists Needed in Federal Service

The need of technologists in the government service continues. Vacancies exist in Washington, D. C., and throughout the country in such agencies as the War and Navy Departments, the Department of Agriculture, and the Department of the Interior. The salaries range from $2,433 to $6,288 a year including overtime pay.

Technologists are especially desired with experience in testing, development, or production in the following industries: coal; food; fuels (liquid); paint, varnish, and lacquer; petroleum; synthetic resins and plastics; electrochemical; and process metallurgical. There will be no written test. For the lower-grade positions at least three years' experience in technology is required, unless appropriate education is substituted. Additional professional experience is necessary for the higher grades. There are no age limits.

Interested persons may secure copies of the announcement of these positions at the nearest first- or second-class post office, or by writing direct to the United States Civil Service Commission, Washington 25, D. C. The announcements contain complete information regarding the requirements and duties of the positions and instructions for applying.

Federal appointments are made in accordance with War Manpower Commission policies and employment stabilization programs.

Virginia-Carolina Chemical Corp., Carteret, N. J., has assigned W. P. terHorst as manager of research and development. Mr. terHorst formerly was head of the organic research department in the general laboratories of the United States Rubber Co., Passaic, N. J., and is known in the industry for his development of B-L-E antioxidant.

Additions to R-1

Several Directions recently were added to Rubber Order R-1. No. 7 reads that starting January 1 crude rubber and latex may be used only in valves, valve adhesion pads, splicing gum strips and cements, and identification inks and cements for tubes used in city and intercity bus mileage contract tires of cross-sections 10.00 and larger.

Direction 8 gives the compound designation and maximum crude rubber content for a 7.50-16 six-ply standard highway tire and for 21.00-24 20-ply and 24-ply rock service tires.

The next Direction provides that until March 31 no Grade A camelback or capping stock may be manufactured in crown widths of less than 5¼ inches and in depth gage of less than 14/32-inch, including cushion gum, except to fill government orders. The manufacture of wing-type die sizes shall be permitted only to fill government orders, or for use in retreading off-the-road tires.

After January 15, Butyl may be used for inner tubes for light trucks, according to Direction 10, which applies to tubes for both government and civilian use in sizes 6.00x17, 6.00x20, 6.50x17, and 6.50x20. Tubes in these sizes had been manufactured from Buna S because the supply of Butyl was insufficient. The use of Butyl tubes in the sizes specified will make available better tubes for users of light trucks, as WPB said Butyl is the synthetic best adapted for use in tubes and is superior to crude rubber in its resistance to air leakage. The new expansion in the use of Butyl for inner tubes is the second since November 9, 1944. Butyl has been permitted for tubes only in very large truck and bus sizes down through and including 7.00 cross-section.

James F. Clark, director of the Rubber Bureau, announced recently that WPB has issued an amendment to Rubber Order R-1, Appendix III, section 4600.40, for the purpose of conserving available supplies of cotton tire cord and fabric. This will be accomplished by restricting the consumption of these materials in the production of passenger, motorcycle, and bicycle tires. This amendment provides that no manufacturer of passenger motorcycle, or bicycle tires shall consume any cotton in these products except as specifically authorized by WPB. January 1-March 31, 1945, is the period for which authorizations are now being issued.

Because a sufficient supply of rayon tire cord will not be available in the first quarter of 1945, cotton cord will have to be substituted in some of the smaller truck-sizes. It is possible to substitute 1.3 pounds of cotton cord for one pound of rayon cord.

Other WPB Announcements

Portable milking machines may be made with rubber tires less than 2¼ inches in cross-section. Such tires are not produced with tire-making facilities and are not considered "tires" by the Rubber Bureau, WPB said. Amendment 3 to the farm machinery order, L-257, issued January 16, adds portable milking machines to the list of farm equipment exempted from the prohibition on manufacture of equipment with rubber tires. It also clarifies the exemption for items requiring tires mounted on wheel rims of specified sizes by limiting tires to the farm implement type (not automotive). Permitted wheel rims are 15, 16, 18, 20, and 21 inches in diameter.

Direction 2 to L-257, covering the sale of wheel-type tractors for industrial use with construction machinery attachments, was also amended to remove references to obsolete forms and procedures.

Priorities Regulation 3, as Amended January 4, 1945, adds to List B, application covering products thereon to be on Form WPB-541, hard rubber drums and tire retreading, recapping and repair equipment, including full-circle and sectional air-bags. Previously the latter had read "tire retreading, recapping and repair equipment except for recapping or repair of truck tires 8.25 by 20 and larger."

Conservation Order M-328, as Amended January 4, 1945—Provisions Applicable to Textiles, Clothing and Related Products—among other revisions adds to Schedule B—rejects that may be delivered only on specific WPB authorization—synthetic rubber thread and products made therefrom.

General Allocation Order M-300, Schedule 34 as amended January 6, 1945, among other changes provides that in the case of orders for urea or melamine aldehyde resins for protective coating purposes, end use shall be stated specifically if the requested resins contain phthalic alkyd resins, and shall be stated in terms of the end use groups of Direction 2 to M-300 if the requested resins do not contain phthalic alkyd resins.

The following orders have been revoked and their respective products made subject to General Allocation Order M-300: M-275-Alkanolamines; M-327-Ethyl Acetate and Isopropyl Acetate; M-363-Carbon Tetrachloride; M-246-Phenolic Resins and Phenolic Resin Molding Compounds.

Last month the following also were made subject to the restrictions of M-300 because of defense needs: potassium carbonate and lead chemicals.

To simplify controls and save paper work, WPB amended M-340—Miscellaneous Chemicals—eliminating allocation control of the chemicals governed by the order and adding five new chemicals to it. Dipentene, stabilized rosins, heat treated rosins, polymerized rosins, and metal resinates are the five new chemicals affected. Consistent with this action, Schedule 13 (dipentene) of M-300 and M-355—Stabilized Rosin—were simultaneously revoked.

Witco Employe Pension Plan Adopted

Witco Chemical Co., 295 Madison Ave., New York 17, N. Y., has adopted an employes' retirement plan designed to provide retirement pensions at age 65 to supplement the benefits provided by the Social Security Law. All employes of the company and its subsidiary, Pioneer Asphalt Co., including those employed at all plants and offices, participate in the plan after they have completed five continuous years of service. The entire cost of the plan is absorbed by the company. The retirement annuity is based upon a percentage of current earnings each year, and in the case of certain older employes additional annuities have been purchased based upon years of service prior to the inception of the plan. It was also announced that the pension rights that have accrued to employes now members of the Armed Forces remain in effect and that service in the Armed Forces is to be included in calculating the five-year eligibility requirements.

OPA Orders Changed

A minor change in rubber footwear rationing regulations permits "seconds" of below-knee height heavyweight boots (Type 3) to be classed and sold as below-knee height lightweight boots (Type 4), according to Amendment 15 to RO 6A—Men's Rubber Boots and Rubber Work Shoes—effective January 9. Dealers and manufacturers must report the reclassifications to OPA. The action affects only those Type 3 boots that are imperfect and have therefore been identified by the manufacturers as "seconds" either by branding the word on each boot or by punching a small hole in the upper part of each, according to customary trade practice. OPA explained that action to permit Type 3 seconds to be sold against Type 4 certificates is being taken to help ease the supply situation. Stocks of the lightweight Type 4 boots are so limited that dealers in some areas are unable to fill orders for all certificate holders. On the other hand small quantities of heavyweight Type 3 seconds are now backed up in dealers' stocks, and larger quantities—trade estimates run somewhat under 10,000 pairs—are frozen in manufacturers' stocks. These are principally boots made on government order and rejected because of slight defects. Although they are of good quality, they are not selling because the supply of first-quality boots of this type is sufficient to fill the certificate demand. No advance notice of the reclassifications need be given to OPA, but brief inventory records and reports are required. Before making the sales, each establishment must attach to its OPA inventory form a statement showing the former and present classification and the number of pairs reclassified. A copy of this statement must be sent to the establishment's OPA district office.

Order 26 under 1499.3 (e), General Maximum Price Regulation, sets, effective January 18, retail prices of sales by department and chain stores of non-molded, heel-strap-type women's overshoe made from neoprene latex by So-Lo Works, Inc., Loveland, O.

Amendment 7 to MPR 406—Synthetic Resins and Plastic Materials and Substitute Rubber—effective January 13, designed to tighten control of pricing of such materials which were not marketed during March, 1942, the base price date for these commodities, specifically states that prices reported, proposed, or established for items not marketed during that period may be reviewed, revised, or revoked by OPA at any time. Previously the right of the agency to revise such prices during the period 20 to 120 days after filing, or at any time later than six months after filing, was not clear. OPA may now act at any time, if necessary, to bring prices for the new items in line with those for similar commodities priced at March, 1942, levels under other provisions of the regulation.

Order 3269 to MPR 188, effective January 9, sets ceilings for all sales and deliveries by Chatsworth Mfg. Co., Chatsworth, Ga., of automobile tire pump No. 101.

An advisory committee consisting of eight members whose companies produce tire and tube repair materials has been appointed by OPA, and an organization meeting was scheduled to be held at the OPA Regional Office in Chicago, Ill., January 29-30. The committee will discuss with OPA, pricing problems on such tire and tube repair materials as tube repair kits, tire patches,

airbags, and curing bags. Ceiling prices for tire and tube repair materials that are the same as those manufactured during March, 1942, are now "frozen" as of that date under RMPR 131, which also provides a formula for the pricing of new or altered products. Approximately 50 concerns with a business volume of about $22,000,000 manufacture tire and tube repair materials. About 85% of the companies are in the Akron, O., area. The remainder are on the Atlantic Coast and in the southern and far west regions.

Members of the committee are: E. A. Schneider, sales manager, Miller Tire & Rubber Co., Akron; Albert Buxbaum, treasurer, Buxbaum Co., Cantôn, O.; Charles W. Yelm, vice president, Gates Rubber Co., Denver, Colo.; Ernie Leach, sales manager, General Tire & Rubber Co., Akron; T. J. Bagley, director of research, R. M. Hollingshead Corp., Camden, N. J.; W. C. Holmes, sales manager, Dill Mfg. Co., Cleveland, O.; Griffith E. Oliver, president, Oliver Tire & Rubber Co., Oakland, Calif.; B. C. Eberhard, manager, tube and accessory development department, Goodyear Tire & Rubber Co., Akron.

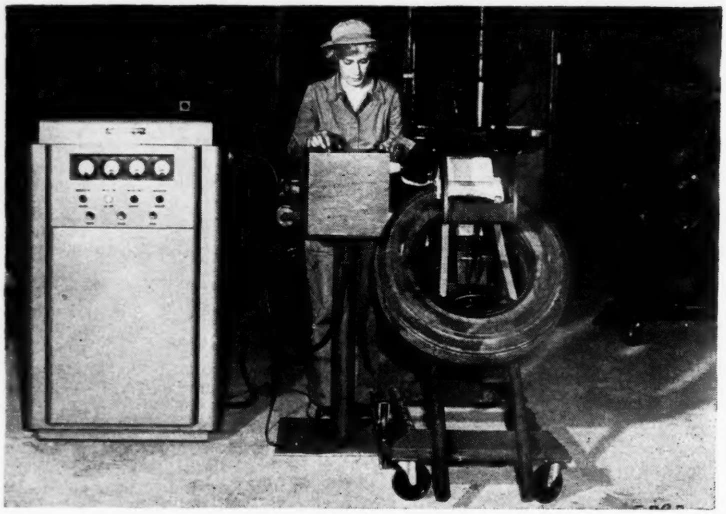
Ceiling prices granted individual manufacturers since May, 1944, on new original equipment tires and tubes will apply to any other manufacturers making the same tires and tubes, according to Amendment 3 to RMPR 119—Original Equipment Tires and Tubes, effective January 31. The ceilings are thus extended by listing the ceilings, which were originally given by letters of authorization, in the original equipment tire and tube regulation. At the same time the ceiling prices for original equipment agricultural tires and tubes have been revised in a number of instances to bring about a more equitable relation between various sizes.

Order 23 and Amendment 1 thereto to MPR 528—Tires, Tubes, Recapping and Repairing—cover retail ceilings for two sizes of new solid industrial and four of new all-purpose (super traction) truck tires made by The Goodyear Tire & Rubber Co., Inc., Akron, O.; while Orders 24 and 27 relate to maximum retail prices for eight new all-purpose truck tires manufactured by The B. F. Goodrich Co., Akron. Orders 25 and 26 set retail ceilings for specified Goodyear traction and farm implement and tractor tires.

Wilmington Chemical Corp., 10 E. 40th St., New York, N. Y., has named C. Gordon Urquhart president to succeed Herbert Waller, resigned. Mr. Urquhart was formerly vice president of National Foam System, Inc. Henrik J. Krebs, formerly secretary and a director of the firm, succeeds A. D. Bestebreurtje, also resigned, as treasurer. Both Mr. Waller and Mr. Bestebreutje remain as directors.

Jefferson Chemical Co., Inc., 30 Rockefeller Plaza, New York, N. Y., recently formed jointly by American Cyanamid Co. and The Texas Co. to manufacture and sell chemicals from petroleum, has appointed M. Neuhaus director of research, L. P. Scoville chief engineer, and J. M. Porter chemical engineer. This trio constitutes the nucleus of the initial research, development, and engineering program planned by the company. Dr. Neuhaus and Mr. Scoville have each been with The Texas Co. for 12 years; while Mr. Porter has been with American Cyanamid since 1928.

EASTERN AND SOUTHERN



Electronics Patch Army Tires

Electronic Vulcanization

Electronic heating methods have been utilized by the Air Technical Service Command at Wright Field, Dayton, O., to extend the life of damaged truck tires. By using this method[1] many kinds of vulcanizing can be done in a small fraction of the time required by conventional steam installations. Because heat is developed in all sections of the rubber simultaneously, the danger of overbaking the surface in order to reach internal layers is avoided. The electronic heater, shown in the accompanying illustration, which supplies high-frequency energy for the vulcanizer, was developed by the research and engineering laboratories of North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y.

[1] India Rubber World, Aug., 1944, p. 544.

U. S. Rubber Advances Several

In a move to broaden the scope of his organization for future operations, J. C. Ray, sales manager, Fisk tire division, United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y., reported recently a number of promotions, extending the responsibilities of those on his general office staff and in the field. H. E. Malcomb is now merchandise manager of tires and, as such, responsible for the merchandising of all Fisk tire products. A. N. Guy has been raised to manager of business development, which position carries with it many added responsibilities, and A. G. Richtmyer has been promoted to manager of distribution planning. The importance of distribution planning to the immediate and postwar future led to creating this new position, calculated to render a valuable service both to the company and its tire distributers. In recognition of the postwar need of aggressive sales promotion effort, C. N. Suffill has been moved up as manager of sales promotion and publicity and will also remain editor of "Fisk Tire Times."

H. C. Cookson has been transferred from the plant in Detroit to the New York general office as sales operations manager for the Fisk division—also a recently broadened post, relating to coordinating sales and administrative policies. Besides, A. M. Watt has been elevated to the managership of the passenger-car tire department.

In addition the following promotions have been made in the field: J. J. Davison, transferred to the Los Angeles branch where, as assistant district manager, he will assist in directing the broadened service planned at that point; W. G. Mosher, former merchandising representative in the Portland district, now district manager of the Portland branch; H. L. Rogers, formerly merchandising representative in the Los Angeles district, now district manager at San Francisco, succeeding W. B. Smith, promoted to special accounts supervisor for the West Coast and Hawaiian Islands territory.

Mr. Ray also announced a new branch servicing point at Cincinnati from which will be served areas previously part of the Detroit, Memphis, Atlanta, and Chicago branches. J. G. Moore, merchandising representative of the Memphis branch, becomes district manager at Cincinnati.

On a business trip to the Midwest and Southwest, Mr. Ray recently addressed a capacity audience of the Sales Managers' Bureau of the St. Louis Chamber of Commerce on "The Road Ahead for Sales Management."

Plant Operations Expanding

U. S. Rubber will begin manufacturing operations in Burlington, N. C., about March 1, according to E. G. Brown, general manager of the Lastex yarn and rubber thread division. Yarns for surgical stockings for the Armed Forces will be scheduled first for production. On completion of all necessary war work a long-range program will be inaugurated to supply Lastex for the hosiery trade.

United States Rubber recently disclosed that a large part of its tube production at the Indianapolis, Ind., plant has been con-

Filling Drums in U. S. Rubber Cement Plant at Indianapolis .

verted from GR-S to GR-I (Butyl) to meet increased military demand for Butyl rubber tubes. John Cady, factory manager, said that Butyl's chief superiority was in its ability to hold air three times better than natural rubber and that it excels other synthetics in this respect by an even wider margin. He also stated that Butyl tubes have a higher tear resistance than inner tubes made of tree or other synthetic rubbers.

"Butyl also has greater resistance to heat," Mr. Cady added. "The ability of Butyl tubes to perform inside the hottest tires is one of its important attributes."

The new building for producing rubber cement needed in building synthetic tires and tubes has been completed at the Indianapolis plant, Mr. Cady revealed.

Marketing Conference

The American Management Association held a three-day conference devoted to marketing and distribution problems of the postwar period, January 3-5, at the Waldorf-Astoria Hotel, New York, N. Y. At a session on transition and postwar pricing Chester Bowles, OPA Administrator, discussed food rationing, control of livestock prices, pricing policy as it applies to jobbers, wholesalers, retailers, and sales agents, the clothing situation, and reconversion pricing. He believes that most consumer durable goods, as vacuum cleaners, washing machines, and radios, could be placed on sale in the reconversion period at the same prices charged consumers in the first months of 1942. Manufacturers will be required to absorb at least in part wartime labor and material cost increases.

John J. Abbink, president of the Business Publishers International Corp., told the conference that the United States has no choice but to assume the leadership in efforts to stimulate the flow of world trade after the war if its cessation becomes not merely opening "the door again to an era of economic warfare." He stressed the need of American stockpiling of strategic materials to avert disaster should the need of large amounts of such materials arise, but he pointed out that such stockpiling would not provide a permanent solution to the problem of imports.

Stanco Distributors, Inc., 26 Broadway, New York 4, N. Y., recently announced price reductions on SR-6 and SR-10, reference fluids for immersion testing rubber and paint materials for resistance to aromatic fuels. In 50-gallon drums SR-6 is 85¢ a gallon and SR-10 is 60¢ a gallon. In five-gallon cans prices are slightly higher. These prices include non-returnable containers. The fluids comply with tentative A.S.T.M. specifications for rubber swelling immersion test media.

Hewitt Expanding

Hewitt Rubber Corp., Buffalo, N. Y., has stated that its recently announced expansion program will permit increased output of conveyer belts, transmission belts, and many types of industrial hose. The company also will increase its production of molded rubber articles for use in industry. In making the announcement, President Thomas Robins, Jr., revealed that wartime requirements have greatly expanded their facilities for production of these articles. The new equipment at the main Buffalo plant more than doubles the prewar capacity of mixing rubber and of forming the raw stocks into sheets. For more than five years Hewitt's production facilities have been used to build war equipment. Mr. Robins further said:

"Because of Hewitt's production of self-sealing gas tanks and other war equipment, we now employ four times as many as in any prewar year. We want to keep employment at a high level and have been thinking and planning in that direction (for postwar)."

During the war Hewitt has built large quantities of complex molded rubber parts used in fuel tanks for warplanes. Recently the company perfected a new type of injection molding process, which is claimed will lower the cost and improve the quality of many molded rubber articles.

A new Banbury mixer is being installed at the Hewitt plant at a cost of $150,000 to increase mixing capacity in the molded goods department. After the war Hewitt expects to add molded rubber parts for automobiles, vacuum cleaners, refrigerators, and other general public market items to its list of products.

Nesbit Heads Reclaimers

Jean H. Nesbit, U. S. Rubber Reclaiming Co., New York, N. Y., was named president of The Rubber Reclaimers Association, Inc., at a recent directors' meeting. C. R. Shaffer, Xylos Rubber Co., Akron, O. will serve as vice president, and C. T. Jansen, 10 E. 40th St., New York, as secretary-treasurer. At the annual meeting of the reclaimers association January 16 the following were elected directors for 1945: D. W. Bernstein, Panther Panco Rubber Co., Chelsea, Mass.; R. E. Casey, Naugatuck Chemical Division, United States Rubber Co., New York; C. R. Shaffer, Xylos; F. E. Traflet, Pequanoc Rubber Co., Butler, N. J.; and G. K. Trimble, Midwest Rubber Reclaiming Co., East St. Louis, Ill.

Fred Conover, Naugatuck, will head the technical committee as chairman. Also on that committee are: R. L. Randall, Midwest Rubber; E. B. Busenburg, Philadelphia Rubber Works, Akron; W. G. Kirby, Naugatuck; Douglas Chalmers, Gates Rubber Co., Denver, Colo.; F. L. Kilbourne, Xylos; D. S. Morse, Bloomingdale Rubber Co., Chester, Pa.; Irving Laurie, Laurie Rubber Reclaiming Co., New Brunswick, N. J.; S. C. Nicol, Goodyear Tire & Rubber Co., Akron, O.; J. S. Plumb, U. S. Rubber Reclaiming; Mr. Traflet; J. C. Watson, Boston Woven Hose & Rubber Co., Boston, Mass.; and Arthur Rose, Panther Panco.

The executive committee includes: chairman, Mr. Trimble; A. I. Brandt, Philadelphia Rubber, and Mr. Casey.

On the capacity committee are: chairman, Mr. Shaffer; Mr. Traflet; and H. S. Royce, Boston Woven Hose.

Members of the scrap committee are: chairman, E. H. Brooks, Goodyear; Mr. Shaffer; Mr. Traflet; and Williams Welch, Midwest Rubber.

The membership committee consists of: chairman, Mr. Morse, and Messrs. Bernstein and Laurie.

Appointed to the advertising committee were: chairman, Mr. Brandt; J. P. Coe, Naugatuck; and Mr. Trimble.

It was decided that at the request of the chairman of the technical committee chemists of the other member companies may be called for collaboration.

Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh, Pa., has appointed Harry R. Kluth general manager of its 77 warehouses, succeeding Frank Clarke, now in Brooklyn as warehouse manager and eastern manager. Succeeding Mr. Kluth in Philadelphia is H. E. Zoll, with the company 22 years. Mr. Kluth started as an office boy for the company 35 years ago in its Philadelphia branch. In 1935 he was made manager and a year later district manager. Mr. Zoll was assistant manager at Philadelphia until he was assigned several months ago to special industrial relations work in the general office of the company in Pittsburgh. William H. Marsh, of the Philadelphia branch, was named assistant manager of the Philadelphia warehouse, where he had been paint manager.

The Vulcanized Rubber Co., manufacturer of hard rubber and molder of plastics, Morrisville, Pa., has appointed Nicholas J. Jammal works manager. For the past several years he had been superintendent of the company's rubber molding and injection plastics molding divisions.

Hercules Powder Co., Wilmington, Del., has created a subsidiary, Hercules Powder Co., Ltd., for the distribution of technical information on its chemical products in Great Britain and Eire. The company, with offices at 140 Park Lane, London, will be under the direction of Cornelius H. B. Rutteman, managing director. Directors are Thomas H. Cooke, manager of Holden Vale Mfg. Co., Haslingden, Lancashire, a partly owned subsidiary of Hercules; R. H. Oxley, manager of the London branch of the Bankers Trust Co. of New York; Kenneth D. Cole of Linklaters & Paines, solicitors; and Mr. Rutteman. Hercules has been selling chemicals in Great Britain for 25 years, and throughout the period its technical representatives have been assisting distributers and customers in the utilization of these chemicals. Mr. Rutteman has been the company's resident representative in London since 1939. The London office will administer the company's English business and assist customers and local distributers with data and technical service on the use of Hercules products, which include cellulose derivatives for lacquers and plastics, terpene and rosin chemicals, synthetic resins, and paper makers chemicals.

Martin Rubber Co., Inc., Long Branch, N. J., has made Charles Fenlason vice president; he had been superintendent and in his new capacity will be in complete charge of production. Anthony Appella and Heinz Goldstein have been promoted to assistant superintendents. Plans are now being formulated for a new building to be erected as an addition to the present premises of the company.

Thermoid Co., Trenton, N. J., according to F. E. Schluter, president, will purchase the plant and equipment of the Grizzly Mfg. Co., Los Angeles, Calif. There will be no change in the Grizzly line of industrial and oil field rubber products. The Grizzly trade mark will be continued for a time, and Walter Smith, vice president and general manager of Grizzly Mfg., will become manager of the Los Angeles plant.

Foreign Economic Administration, Washington, D. C., on January 12 issued Amendment 277 to General License "GLR", which rules that tires and tubes owned and used in Mexico which are imported into the United States for repair or recapping may be returned to Mexico together with any material incorporated therein by repair or recapping, provided that such tires and tubes are imported into the United States (1) under a six-month bond for exportation, or (2) under any other form of entry pursuant to which such tires and tubes are marked or recorded by the collector of customs at the port of importation so that they may be identified when exported.

Direction 11 to R-1 (January 16 prohibits the purchase and consumption of polyisobutylene (Polybutene, Vistanex, and Synthetic 100) for experimental purposes. Appeals may be made by filing WPB Form 2242 with the Appeals Unit, Rubber Bureau, War Production Board, Washington, D. C., pursuant to 4600.18 of R-1.

Houdry Process Corp., Chester, Pa., last month announced that its research and service subsidiary, Catalytic Development Corp., had changed its name to the Houdry Process Corp. of Pennsylvania in order to identify the subsidiary more closely with the parent organization.

"Softeners for GR-S" Reprints Available

In response to numerous requests, we have prepared rotoprints of the article "Softeners for GR-S" by B. S. Garvey, Jr., and his coworkers, which appeared in the October and the November, 1944, INDIA RUBBER WORLD. Copies may be obtained from 386 Fourth Ave., New York 16, N. Y., if the request, accompanied by 50c for each copy, is forwarded promptly.

Molding Press Uses Electronic Heat

Baldwin Southwark Division, Baldwin Locomotive Works, Philadelphia, Pa., according to Ralph Kelly, president, has developed a vertical hydraulic "hyspeed" press for molding plastics which utilizes electronic heating of the plastic material to effect substantial economies in production time. The two kilowatt electronic heating unit is separate from the press itself. The plastics division of Monsanto Chemical Co., St. Louis, Mo., and the electronics division of Westinghouse Electric & Mfg. Co., Pittsburgh, Pa., were associated with the Baldwin company in the development. Experiments with the press on resins, ureas, and melamines have been conducted for the past several months in the Hemco plant of the Bryant Electric Co., Bridgeport, Conn.

High-frequency heating is said to have reduced curing time from minutes to seconds. Changes in mold design and a method of squeezing the preheated plastic into the mold have made possible production from a small press with a small number of cavities equal to or greater than that of a large compression press with a large number of cavities. In one experiment workmen turned out 20% more pieces from a six-cavity mold than were previously turned out from a standard 24-cavity compression mold. The estimated mold savings was $6,000 in addition to a 12½% savings in materials.

The possibility is said to exist that a great many common mold products, such as electric insulating parts and novelties, etc., which are now injection molded from acetates, may in the future be made from phenol or urea materials, utilizing the Baldwin method, with a favorable comparison in cost.

Because high-frequency heating establishes heat inside the preforms as quickly as on the outside, there is no opportunity for the outer portion to overcure before the inside gets hot. Since the preforms go into the mold hot, much lower pressures can be used, which in turn permit smaller presses. It is estimated as a result of lowered pressure that for a particular job the press would cost about one-third of a straight compression press, that maintenance costs will be reduced to a fifth, and that the molds will have 30% longer life.

The experimental Baldwin machine is a 75-ton molding press which could be used for both compression and transfer molding. It has an hydraulic plunger on top which is used for pressing the preheated material into the mold. This cylinder is not operated in straight compression molding. The unit is operated with a self-contained oil pump on the side of the press. The units will be available in capacities of from 50 to 300 tons. They can be operated either directly from an accumulation system or by means of separate self-contained motor driven pumps. Tests are continuing on the experimental model concerning its use for rubber and other materials.

Shell Union Oil Corp., 50 W. 50th St., New York 20, N. Y., on January 2 announced the retirement of Daniel Pyzel, vice president in charge of research and a director. A veteran of 47 years' experience in the oil business, Mr. Pyzel is well known for his interest and active participation in many of the new chemical developments which the petroleum industry has adopted in the past three decades, and he has been directly responsible for several of Shell's technical advances in this field. He was also an important factor in the organization of the Shell Development Co., Emeryville, Calif., in 1928, from which came one of the first successful and practical methods of producing butadiene used in the manufacture of synthetic rubber.

Taylor Instrument Cos., has promoted Frank Ward, formerly divisional sales manager, in charge of products used in the rubber industry, to the position of assistant industrial sales manager. During his 26 years with the company, Mr. Ward has held a number of managerial posts. After serving as field representative in New England for a short time, he became branch manager of that area, where he continued until he was called back to Rochester to become divisional sales manager. For the past two years he has had the added responsibility of managing the priorities production scheduling department.

Peter J. Gaylor has resigned from the Standard Oil Development Co. to open law offices at 1121 Kinney Bldg., 790 Broad St., Newark 2, N. J. He will specialize in patent law, trade marks, and copyrights. Mr. Gaylor also will publish the *Technical Survey*, a weekly service covering new developments and trends in technology.

Treasury Department's Office of Surplus Property, Washington, D. C., on January 19 announced that sale of consumer goods during December totaled $12,105,-854.34, mostly of surpluses turned over to the Treasury Department by the Army and the Navy. Among the sales listed were: new and used tires to The B. F. Goodrich Co., Akron, O., for $506,880 and to Armstrong Rubber Co., West Haven, Conn., $13,725; and tires, to Firestone Tire & Rubber Co., Akron, $54,790, and to Seiberling Rubber Co., Akron, $13,242.

Pennsylvania Rubber Co., Penn-Craft Park, Jeannette, Pa., has appointed Gordon H. Groth and R. B. Cave vice presidents. Mr. Cave will continue as sales manager in charge of commercial and dealer business, and Mr. Groth will continue as assistant to the president in charge of all government and special contracts. Before joining Pennsylvania Rubber, Mr. Cave was assistant sales manager of Electric Auto-Lite Co., Toledo, O.; he has been sales manager of Pennsylvania Rubber for more than three years.

Howard W. Jordan, Pennsylvania president, also announced the appointment of J. W. Osbon as controller. Before joining the company Mr. Osbon was assistant comptroller of the Pittsburgh Plate Glass Co., Pittsburgh, Pa.

OHIO

Goodrich Personnel Changes

Robert V. Yohe, plant manager of the Louisville, Ky., government owned synthetic rubber plant, built and operated by The B. F. Goodrich Co., Akron, has been elected vice president of the Goodrich affiliate, American Anode, Inc., Akron, and has been succeeded at Louisville by W. W. Scull, general manager at the Port Neches synthetic rubber plant. J. E. Miller has been named plant manager at the latter plant.

Dr. Yohe, in the rubber industry since 1931, joined Goodrich as a research chemist and was made manager of the general chemical laboratories in 1936 and technical superintendent of the company's sundries, sponge rubber, and latex products division three years later. In 1942 he became assistant director of synthetic rubber research and was technical superintendent of the company's chemical division until assuming direction of the large synthetic plant.

J. E. Carhart has been made manager of the tire conservation department, succeeding John T. Staker, recently appointed Pacific Coast manager for the international division. Mr. Carhart, with Goodrich 25 years, went into field testing of tires in 1926, after having previously set up a control system for mileage contracts, then was in the mileage contract sales department from 1929 until 1938, when he went to the Buffalo district as truck and bus tire representative, returning to Akron in July, 1941. Mr. Carhart also organized the B. F. Goodrich Army Training School, and when the tire conservation department was formed in February, 1942, he took over the maintenance activity of the conservation program.

Assisting Mr. Carhart in the tire conservation department under a new alinement are: Paul G. Viall, maintenance manager; Frank Tobin, sales and maintenance supervisor; and L. C. Hutchinson, industrial consultant. Don Agnew, consultant in the Buffalo district, recently joined the department in Akron as staff consultant.

Emory Smith, with Goodrich since 1929, was named to the Washington staff of the company's international division. After graduating from college, Mr. Smith entered the rubber industry as credit and operating manager of a retail store in Maryland, assuming a similar position in a company-owned store in Staunton, Va. He was transferred to the company's Washington district in 1936 and the same year became manager of the central accounting office there. After service as manager of district accounting there and in Seattle, Wash., Mr. Smith returned to Washington as operating manager of Goodrich's government sales department. In January, 1944, he was assigned to assist government agencies on tire replacement sales.

Harold W. Rehfeld, Goodrich tire technician, was appointed expert consultant to the Commanding General of the Army Service Forces in Europe with headquarters in France. Mr. Rehfeld will advise the Army Service Forces on tire service and maintenance as well as the rubber manufacturers of Belgium and France on the use of synthetic rubbers and other raw materials. Mr. Rehfeld, who had been production manager of the tread and calender room in the company's Akron tire division, joined Goodrich in 1929 as a chemist following his graduation from the University of Minnesota. He served as manager of technical laboratories in the Los Angeles factory from 1938 to 1940 and was made factory manager of the Oaks, Pa., tire manufacturing plant in 1941.

Reports on Goodrich Plants

One of the nation's largest tire manufacturing plants, built by Goodrich, is now nearing completion at Miami, Okla. Started early last year, the plant was scheduled to begin production last month.

Two government synthetic rubber plants in Borger, Tex., and Louisville, Ky., built and operated by Goodrich, have produced 300,000,000 pounds of man-made rubber since beginning operations in August, 1943, and December, 1942, respectively. The combined output of the two copolymer plants is equivalent to the normal yield of approximately 28,000,000 Far Eastern rubber trees which would require the services of about 79,000 natives for the necessary cultivation and preparation of the rubber. The two rubber plants currently employ about 1,200 men and women.

Goodrich reports that another European tire plant, Banloc, near the Ploesti oil fields in Rumania, liberated from German occupancy in August, soon will resume manufacturing operations, and its output will go to the Allied armies. Banloc was engineered, built, and operated by Goodrich for Rumanian interests sponsored by that government until the outbreak of the war. The plant, with an annual capacity of 100,000 tires, had been running on a limited basis under German direction, the Goodrich company was advised. Until recently Goodrich had received no word from Rumania for four years.

Goodrich has established a new products department in the aeronautical division to develop new products of rubber, synthetic rubber, and plastics for aviation uses.

S. W. Caywood, general manager of Goodrich's international sales division, recently received a sample of smoked sheet grown in Hawaii from H. F. Weber, manager in Honolulu of the Goodrich division. The Hawaiian rubber is the only tree rubber being grown in United States territory except for some experimental plantings in Florida.

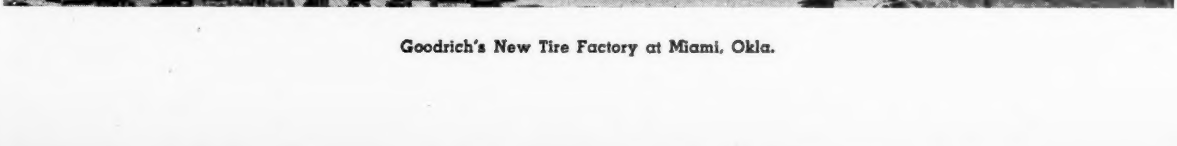
Lightproof tents of rubber and fabric construction used for making X-ray pictures of injuries suffered by military forces in action are being produced by Goodrich. Designed by the Army Medical Corps to prevent the tiniest flicker of light from penetrating the interior, the tents are erected as units of field hospitals immediately back of the fighting fronts.

A heavy-duty acid-proof apron, made with a treated fabric combined with a new plastic by a special calendering process which impregnates the fabric so that it is acid proof throughout, is another new Goodrich product. It comes in one size only, 35 by 47 inches, full, and weighs 1¾ pounds complete with sturdy ⅞-inch wide tape, criss-cross shoulder design, attached securely with reenforced grommets at top and side, and with edges hemmed throughout. It can be easily washed or cleaned without harm to its acid-proof qualities.

Tests Neoprene-Fiberglas Conveyer Belts

Goodrich has announced the results of tests on its neoprene-coated Fiberglas fabric conveyer belts, which were tested on a factory conveyer line operating on a continuous 24-hour, seven-day-a-week schedule and carrying materials averaging 300° F. The belts were subjected to considerable flexing and exposed to oil used in the binder of the material carried. Of eight such belts six were performing efficiently at the end of seven months' service. One failed at the end of six months because of extreme stress at a time of operating difficulty, and another was burned through by a piece of red-hot material after three months' service. In fabricating the belts two inner plies and two outer plies of Fiberglas cloth, 36 inches wide, were thinly coated with neoprene and calendered to obtain the required thickness of coating. The coated, uncured plies were assembled; the neoprene cover was applied; and the entire assembly press-cured and cut to required lengths and widths. Adjustments to keep the belts in even tension are seldom found necessary because of the high resistance to elongation of Fiberglas cloth.

The Timken Roller Bearing Co., Canton, has constructed a dioramic display showing an invasion landing scene on the Normandy coast for the Museum of Science & Industry, Rockefeller Center, New York, N. Y. It is the first diorama to employ motion in three elements—on land, sea, and in the air. In the foreground actual scale models of tanks, guns, and armored vehicles travel across the beachhead, and streams of mechanized equipment pour from the ramps of three LST boats offshore. Back of the boats is a display of water with waves rolling shoreward. The wave motion is effected through a system of rollers which synchronize with rocking ships placed between the rollers. In the translite panels on each side of the landing scene a brief message covering the contributions of the Timken company to the war effort is shown. These cover bearings, steel tubing, rock bits, and the Timken method of making gun tubes.



Goodrich's New Tire Factory at Miami, Okla.

Executives of New Adamson United Co.

As announced last month, the Adamson Machine Co., Akron, has become a subsidiary of United Engineering & Foundry Co., Pittsburgh, Pa., and is now known as the Adamson United Co. F. L. Dawes, general manager of the former Adamson Machine Co., is president of the new company, and Andrew Hale, former Akron sales manager of Farrel-Birmingham Co., Inc., is vice president. George Lang, secretary-treasurer of United Engineering, will have the same position with Adamson United.

Adamson Machine Co. was established in 1892 by Alexander Adamson, a native of Scotland. Mr. Adamson was originally a blacksmith, and the original plant was equipped with a forge, and little else. As the rubber industry grew in importance, Mr. Adamson increased the scope of his small establishment, adding machine tools from time to time. In 1917, the present plant, located on Carroll St. in Akron, was started. In this plant were pioneered such basic rubber manufacturing machines as tubers, strainers, mills, and calenders, and much of the equipment built in those days found its way into every civilized country. The company weathered the depression, which started in the year of Mr. Adamson's death, 1929, and was reorganized in 1934. Further improvements were made in engineering and plant facilities. The world's largest tire molds, the largest open-steam vulcanizer, and the world's largest tube machine were designed and built by the Adamson Machine Co.

Dynamometers were required by designers of airplane tires and brakes, and huge machines of this type have been made for some of the largest rubber goods manufacturers and the Amtorg Trading Corp. Adamson at present, in cooperation with Westinghouse Electric & Mfg. Co., Pittsburg, is installing for the United States Army at Wright Field one of these machines, the steel inertia wheel of which weighs 158 tons and, when in use, revolves so swiftly that its outer edge moves at more than three miles a minute. The total weight of this dynamometer is more than 250 tons, and the design and installation work required was started more than two years ago. On the front and rear of the inertia wheel is a mounting axle for an airplane wheel, so connected with compressed air cylinders that each can be smashed into the wheel with terrific force. The eight-ton steel shaft which carries the inertia wheel was forged with utmost care, X-rayed for any possible flaws, and given a long series of tests by Adamson metallurgists. Outside a caged chamber in which the tests are conducted is a large amount of electrical equipment especially adapted to the dynamometer by engineers of Westinghouse. Directly driving the axle on which the wheel is mounted is a 400 h.p. direct current motor. It requires 30 minutes to get the circular mass moving at a speed of 308 revolutions a minute. Tests on this laboratory tester are decidedly more severe than tests under actual landing conditions.

In the modern Adamson plant many machines of outstanding industrial importance and at the same time revolutionary in character have been built. While of general interest, it is not possible to describe them at this time. The products of this company are used for the most part in the rubber industry, but Adamson equipment is also used in the manufacture of various

Akron Beacon Journal

F. L. Dawes

© Bachrach

Andrew Hale

plastics and plywood. Experimental equipment for use in the new treated wood products is being developed, and Adamson autoclaves are used by many chemical plants throughout the United States.

Synthetic Rubber Resin

The Goodyear Tire & Rubber Co., Akron, recently announced production of Pliolite-S, a thermoplastic reenforcing resin obtained by cyclizing a special modification of GR-S. It is said to impart good processing characteristics to GR-S, with which it is readily compatible, particularly in molded, extruded, and calendered products.

Produced in two grades designated as Pliolite S-1 and Pliolite S-3, this synthetic rubber resin is light colored and has a specific gravity of approximately 1.0. It will accomplish the desired hardness in cured compounds in direct proportion to the amounts used. This factor is important for wire and cable insulation, safety helmets, golf ball covers, and similar products where a lightweight impact-resistant product is needed. The new resin also permits production of synthetic rubber products where colors are desired, as in household and decorative items, toys, and kitchen equipment, and where a high resistance to electrical currents is required.

In fabrics and proofed goods Pliolite-S gives firm, dry feeling stocks which readily take embossing. It has eliminated the necessity of using softeners for satisfactory moldability as in an 80 durometer stock for rubber buttons, obtained by a high clay loading.

Pliolite-S can be used in much the same way as was Pliolite derived from natural rubber. Ten to 20 parts of Pliolite-S on 100 parts GR-S will produce the same physical properties, such as high dielectric strength, high tensile strength, and excellent elongation, to stocks that Pliolite imparted. In compounding, GR-S and Pliolite-S are mixed on mill rolls in varying quantities to produce the desired rigidity, hardness, elongation, and tensile strength. Pliolite-S undergoes no appreciable cure although it is desirable, if the sulphur content is critical, to increase the amount of sulphur to insure a proper cure.

The Pliolite-S resins are produced as a powder and as a master-batch. The latter consists of 50% Pliolite-S and 50% synthetic rubber of the Buna S type. The types and grades of Buna S in the master-batch can be tailored to fit individual needs.

Pliolite-S is available in quantity and is as readily obtainable as GR-S. Inherently the material also seems to be of much interest as reenforcer for Buna N, butyl, and other synthetic rubbers.

Chlorinated Synthetic Rubber Developed

L. B. Sebrell, director of the Goodyear research laboratory, recently announced development of a chlorinated synthetic rubber from a new type of synthetic rubber. Dr. Sebrell explained that some time ago it was found that the chlorination of standard GR-S could only be carried out at high temperatures in contrast to the chlorination of natural rubber which is accomplished at fairly low temperatures. Catalysts were developed which enabled the process for standard GR-S to be carried out at lower temperatures, but the problem then, Dr. Sebrell said, " was to get rid of these catalysts in the finished product. In addition, we felt that a superior type of chlorinated rubber could be developed. Accordingly we turned our attention to the development of a new type of synthetic rubber for this purpose."

The new chlorinated synthetic rubber is a creamy white powder with a chlorine content ranging between 60 and 70%. Its resistance to sunlight is equal to that of the natural product, and it shows the same compatibility when mixed with modifiers, plasticizers, etc. It is soluble in all aromatic hydrocarbons, methyl ethyl ketones, chlorinated hydrocarbons, and in esters such as ethyl acetate. It forms paints resistant to both acids and alkalis and with excellent anti-corrosion qualities. When subjected to heat, these paints char and disintegrate chemically, but do not burst in flames. The new chlorinated rubber is now being used in paints, and in their manufacture the pigments are merely ground into a solution of it. The new product is also suitable for sand-core binders in foundries, for bonding metal to rubber, and for other adhesives and cements.

Personnel Activities

Organization of war veterans' employment divisions and company policy regarding men who left for the Armed Forces

were announced last month by P. W. Litchfield, president of Goodyear Aircraft Corp. and chairman of the board of Goodyear Tire & Rubber Co., Akron. Goodyear's policy relative to rehiring employes who entered military service is that they are to be returned to their former positions or to comparable posts. Then progress and position will depend upon merit as in the past. This was the company's stand after World War I. While it is now subject to some limitations and qualifications, made necessary by government regulations, it again expresses in general terms what the company policy will be in respect to the reinstatement of veterans of the current war.

Charles Jones, a former marine with two years' service in World War I, will head the veterans' bureau at Goodyear Aircraft. Working in a similar capacity at Goodyear's tire plants, is C. P. McIntyre of the labor department, whose entire service of 29 years has been in that division.

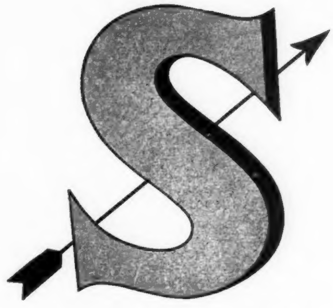
J. E. Mayl, vice president and sales manager of the Goodyear tire division, recently completed 20 years of service and has received his pin from Mr. Litchfield. Mr. Mayl joined Goodyear in December, 1925, in the truck tire sales department. In 1928 he was named its manager, then moved on to managership of the southern division, and in 1937 went to California to head up Goodyear activities there. He returned to Akron last June to direct the sales activities of the tire division.

Leonard Eger, development expert at Goodyear, has been appointed special V-belt representative and sales engineer for original equipment accounts in the Chicago district exclusive of farm equipment manufacturers. For the last several years Mr. Eger was stationed in Detroit to assist in development work on V-belts for military equipment. He started with the Goodyear company in the development department ten years ago.

Hugh Allen, veteran rubber industry public relations man and international authority on lighter-than-air transportation, has completed 25 years' service with Goodyear Tire and its subsidiary, Goodyear Aircraft Corp. Mr. Allen was presented a diamond studded service pin by Mr. Litchfield.

Conveyer-Belt Systems Described

E. A. Mathias, of Goodyear, recently discussed conveyer-belt systems at the Materials Handling Machinery Manufacturers' Conference held at Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Highlighted in Mr. Mathias's talk was his description of the Shasta Dam conveyer-belt system, which carried 12,800,000 tons of sand and gravel a distance of 10 miles. When the construction was completed, the belt covers showed only about 1/32-inch of wear and the carcass almost no deterioration. The system included 26 belt flights with centers ranging from 846 feet to 3,414 feet, depending upon the grade. Grades ranged from 13.8 degrees up to 14 degrees down. The belts, designed for 1,100 tons an hour at a speed of 550 feet a minute, were 36 inches wide, six-ply, with 3/16-inch top cover and 1/16-inch pulley cover. At Grand Coulee Dam, Goodyear engineered and supplied a 60-inch wide belt operating on 4,985 foot centers. After completing the job this 80-ton belt was moved to a cement plant at San Jose, Calif., where it is now operating.



"Arrow S" Adopted by Schulman

New Symbol for Schulman

An "Arrow S" design has been adopted by A. Schulman, Inc., Akron 9, to symbolize its aims and achievements in serving the scrap rubber industry, it was announced last month by President Alex Schulman. The design, a capital "S" pierced by an arrow, will be used by Schulman to represent "the scientific skill that insures satisfaction in scrap rubber." This design has introduced a new motto for the company —"Be *safe* with Schulman." The "Arrow S" will be used generally by the firm, Mr. Schulman said, to emphasize the importance of scientific sorting and select quality to reclaimers.

Softener for GR-S and Reclaim

Piccovol, a coal-tar type of softener recently developed to meet Rubber Reserve Co. specifications, is reported to impart improved properties to finished products made from GR-S and reclaimed rubbers. It is a dark liquid with a specific gravity of 1.09 and a flash point of 111° C. Distillation at atmospheric pressure to 210° C. is less than 1% and to 235° C. is approximately 4%. A GR-S tread formula containing 10 parts Piccovol cured 45 minutes at 280° F. and aged 24 hours at 100° C., when tested, gave the following results: tensile, 2000; elongation, 246; hardness, 74; set, 9; and tear, 220. Piccovol is a product of the Standard Chemical Co., Akron Savings & Loan Bldg., Akron 8, O.

John D. Simpson, secretary-treasurer of the Denman Tire & Rubber Co., Warren, O., has been elected a member of the Controllers Institute of America, 1 E. 42nd St., New York 17, N. Y.

Harvey S. Firestone, Jr., president of Firestone Tire & Rubber Co., Akron, for invaluable service to the Republic of Liberia has been awarded the degree of Commander of the Order of the Star of Africa. This citation is the highest presented by the Republic. Membership in the order is limited to individuals who have made an outstanding contribution in the fields of public service, science, politics, art, or literature. Only a very few persons from countries other than Liberia receive this high honor. The Firestone rubber plantations were started in Liberia in 1925. These plantations, where 51,000 acres are in production and about 30,000 additional acres are being developed, produced 36 million pounds of rubber in 1944, and the figure is expected to go higher in the future.

Dayton Rubber Mfg. Co., Dayton, recently acquired the Jem Rubber Co., Ltd., Toronto, Ont., Canada, which it will operate as the Dayton Rubber Co. (Canada), Ltd. Now making war products only, the Canadian plant will manufacture graphic arts products such as synthetic rubber rollers after the war.

Advertising Club of Akron held its first meeting in Akron on January 15, attended by 150 charter members who elected the following officers: president, J. Penfield Seiberling, president, Seiberling Rubber Co.; vice presidents, Galen C. Cartwright, sales promotion manager, Goodyear Tire & Rubber Co., and Gerald Hornbein, advertising manager, M. O'Neil Co.; treasurer, E. S. Patterson, president, First Central Trust Co.; and secretary, Glen Martin, advertising department, The B. F. Goodrich Co. Among the directors elected, in addition to the officers, are: E. S. Babcox, president, The Babcox Publications; Agnes Colville, Firestone Tire & Rubber Co.; Ralph Harrington, advertising manager, General Tire & Rubber Co.; J. K. Hough, Goodyear advertising manager; Charles B. Ryan, Firestone advertising manager; and Frank T. Tucker, Goodrich advertising director.

Pharis Tire & Rubber Co., Newark, has named Andy Beard manager of the company's service store, according to Hynes Pitner, vice president and sales manager. Associated with Pharis since 1932, Mr. Beard first worked in the curing department, then was transferred to the accessory department in 1941, and became a member of the sales force in 1942, covering southern Ohio, West Virginia, and Kentucky.

NEW ENGLAND

Weather-Resistant Fabric

Athol Mfg. Co., Athol, Mass., recently announced development of its Terson brand rayon voile, a lightweight vinyl resin coated sheer cloth, which provides warmth and strength without weight. The coated cloth ready for use has a total weight of only two ounces per square yard. It will stand 10 pounds' hydrostatic pressure. It is now utilized for rain covers for officers' caps. Postwar uses may include women's rainwear, clothing bags, shower curtains, covers for ice-box containers, etc. Now available in only one color—transparent, it will be produced in various colors after the war. The coated cloth can be made in all grades of synthetic fiber or cotton. When made of nylon, its strength is further increased. Only small quantities are available for non-military use.

Haartz - Mason - Grower Co., Watertown, Mass., has announced that Nehemiah Boynton, Jr., has joined its organization as vice president and sales manager. He was formerly manager of the light mechanical division of The Boston Woven Hose & Rubber Co., Cambridge, Mass.

MIDWEST

American Society of Lubrication Engineers, 135 S. LaSalle St., Chicago 3, Ill., recently was organized as a non-profit body to put on a sound basis the fundamental precepts of lubrication and to promote the subject of lubrication in educational institutions better to prepare future members of industry for a more complete understanding of the operational problems to follow. The Society's first national convention was scheduled for February 8 and 9 at the Stevens Hotel, Chicago.

Monsanto Chemical Co., St. Louis, Mo., has announced several promotions in its organic chemicals division: R. F. Caulk, to manager, flavors and condiments sales; I. J. Stanley, Jr., to manager, and G. W. Buhrman, to assistant manager, heavy chemicals sales; A. P. Kroeger, to manager, intermediates chemicals sales; R. B. Semple, to manager, petroleum chemicals sales; C. W. Merrell, to manager, pharmaceuticals sales; C. H. Sommer, Jr., to manager, plasticizers and resins sales; H. C. Koehler, to manager, special products sales; H. F. Shattuck, to assistant manager, sales development; Wm. M. Russell, to branch manager for the Detroit territory.

Pending the return to duty of Fred C. Renner, who is making good recovery from his serious illness, but is unlikely to be back at work for two or three months, Robinson Ord will serve as acting general manager of sales of the organic chemicals division. Meanwhile A. T. Loeffler, branch manager at New York, was assigned to St. Louis with the temporary title of assistant general manager of sales; A. P. Kroeger, St. Louis, manager of intermediates sales, went to New York as acting assistant branch manager; and the duties of C. H. Sommer, manager of plasticizers and resins sales, will be extended to include those of acting manager of intermediate sales. F. M. Luckett, sales representative in the Chicago territory, was temporarily assigned to St. Louis to assist Mr. Sommer.

PACIFIC COAST

Reeves Rubber Co., Inc., 100 Calle de Industrias, San Clementa, Calif., will build an addition to its present plant for reprocessing synthetic rubber, according to President Ray B. Reeves. Plans are now being drawn, and excavation for a new building will start immediately. The structure will be of wood-frame, 30 by 70 feet. Equipment for the plant has already been purchased.

Leonard C. Boller has organized the U. S. Research & Development Co., 5225 Wilshire Blvd., Los Angeles, Calif., to manufacture custom-made adhesives and sealants and do rubber consulting work. Mr. Boller formerly had been assistant technical superintendent of Pioneer Rubber Mills, Pittsburg, Calif.

Dow Chemical Co. has awarded a contract for an addition to its styrene plant at 20,021 S. Vermont Ave., Gardena, Calif., at an estimated cost of $1,796,000. The new unit will produce ethyl-benzene, it is reported.

Murrough T. Butler, 48, supervisor for the Goodyear Tire & Rubber Co., died January 2 at his home in Los Angeles, Calif. He is survived by his wife, his mother, three sisters, and two brothers.

CANADA

Alan H. Williamson, Canadian rubber controller, in a statement issued from Ottawa, Ont., January 5, warned that the shortage of civilian tires would likely become still more acute because of the step-up in military tire output. Tire rationing representatives throughout the Dominion have been instructed to continue screening all applications for tire permits so that only the most necessary vehicles be supplied until the situation improved. Mr. Williamson further stated that one of the first steps taken to boost military tire production was the cancellation of plans made three months earlier for increased output of tires urgently needed for essential civilian users, as doctors, nurses, police, firefighters, war plants, and milk truckers. He noted that even this cancellation might not prove enough, adding that unless the situation at the battlefront improved rapidly, Canada might not be able to maintain the 1944 rate of civilian output—a rate which did not meet all essential demands.

Dominion Rubber Co., Ltd., Montreal, P. Q., at a recent board meeting appointed C. C. Thackray executive vice president. He was born in Ottawa, attended the Royal Military College, and served in World War I as an officer in the Royal Canadian Artillery. Mr. Thackray joined Dominion Rubber in 1920 and has held many responsible executive positions in the company. In 1933 he became general manager of mechanical and footwear manufacturing and in 1939 vice president in charge of these operations. When the company, shortly after the war began, took over large contracts for supplying tank track, self-sealing fuel cells, and other war specialties, Mr. Thackray took charge of this division along with his other duties. In 1942 he was elected a director of the company. Mr. Thackray is a member of the Royal St. Lawrence Yacht and the St. James' clubs. His son, James, is a lieutenant in the R.C.N.V.R.

Associated Screen News, Ltd.

C. C. Thackray

The Canadian Revenue Department, Ottawa, Ont., announced December 29 that permit controls on importation of manufactured rubber goods had been removed. Import permits still are required for crude natural and synthetic rubber not processed into goods.

Polymer Corp., Sarnia, Ont., recently disclosed that its combined Buna S and Butyl rubber output during November exceeded that achieved in any previous month. Total production was in excess of 8,000,000 pounds, or at the rate of 100,000,000 pounds annually. Designed yearly capacity of the plant is 83,600,000 pounds. At the same time it was revealed that previous production records had also been broken in October, when total production had been 7,345,000 pounds, or the equivalent of 88,000,000 pounds per year. The plant also hit its full stride in October in the production of 2,819,000 pounds of Cumene.

It was also revealed that a faster curing Butyl rubber, which may have desirable qualities for inner tubes, now is being produced and is undergoing tests by manufacturers of such tubes.

The Wartime Prices & Trade Board announced from Ottawa, Ont., on January 6 that Canadian women could expect synthetic rubber girdles to make their first appearance on the market shortly. Supplies of neoprene were released recently to girdle manufacturers.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., has appointed N. S. Grace technical superintendent. R. C. Hughes has been named production superintendent, and his place as head of product design and process control in the mechanical goods department has been taken by S. Parkes. W. H. Bartlett, formerly production superintendent, has been made assistant works manager. W. Morrison is the new superintendent of the tire and tube department.

C. D. Howe, Minister of Munitions and Supply, recently appealed for additional workers for tire plants in the Toronto, Hamilton, and Kitchener areas to step up production to meet what he termed a serious overseas shortage of military tires. At the same time he revealed that tire factories had been given highest labor priority rating and that all suitable men or women going through National Selective Service employment channels would be directed to tire factories. Mr. Howe also requested present tire workers to increase their efforts to the utmost and warned them to get ready for as near a seven-day week as possible.

FINANCIAL

Armstrong Rubber Co., West Haven, Conn. Year ended September 30, 1944: net income, $565,339, against $451,582 in the preceding year.

Hercules Powder Co., Wilmington, Del. For 1944: net earnings, $4,823,855, equal, after all charges including $524,928 in preferred dividends, to $3.26 each on 1,316,710 common shares outstanding, contrasted with $5,704,511, equal to $3.93 each on 1,316,710 common shares outstanding; reserve for contingencies, $200,000, against $1,100,000; net sales and operating revenues, $105,677,952, against $122,518,626; taxes, $12,018,442, contrasted with $18,-069,132.

Lee Rubber & Tire Corp., Conshohocken, Pa., and subsidiary. Year ended October 31, 1944: net income, $1,299,849, equal to $5.38 a share, compared with $1,241,934, or $5.14 a share, in the preceding fiscal year; taxes, $3,692,708, against $2,583,697; net sales, $27,448,418, against $25,236,489.

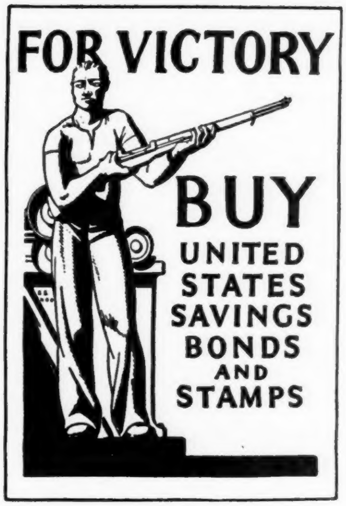
Rome Cable Corp., Rome, N. Y. Nine months to December 31, 1944: net profit, $402,662, or $2.12 a share, against $426,112, or $2.24 a share, in the 1943 period; taxes, $1,715,100, against $1,513,569.

Seiberling Rubber Co., Akron, O., and wholly owned subsidiaries. Year ended October 31, 1944: net income, $510,145, or $1.34 a common share, compared with $609,301, or $1.70 a share, in the previous 12 months; net sales, $22,904,821 (a new high), against $18,283,782; current assets, $6,918,589, current liabilities, $2,756,869, on October 31, 1944.

Seiberling Rubber Co. of Canada, Toronto, Ont. Year ended October 31, 1944: net profit, $55,550, or $1.77 a share, against $64,213, or $2.05 a share in the preceding fiscal year; working capital, $1,005,456, against a deficit of $9,228 a year earlier.

New Incorporations

North Bergen Rubber Mfg. Co., 2021 40th St., North Bergen, N. J. Capital, $30,000. Victor S. Axelrad, 350 Madison Ave., New York, Bernard Miller, 1676 Townsend Ave., Bronx, and A. J. Schickling, 4060 Elbertson St., Elmhurst, L. I., all in N. Y.



Pilgrim Rubber Glove Co., Inc., 205 Rosemary St., Needham Heights, Mass. Capital, 1,000 common shares, no par value. President, Edmund G. Colson; treasurer, Neil E. Tillotson; clerk, E. Scott, all of Needham, Mass.

Seiberling Rubber Export Co., Akron, O. Capital, 250 common shares, no par value. H. W. Slabaugh, E. M. Ruthenberg, and Robert Guinther. To handle all export business of Seiberling Rubber Co., Akron, O.

OBITUARY

Charles E. Brown

CHARLES EDWARD BROWN, executive vice president of The Okonite Co., Passaic, N. J., died in Chicago, Ill., January 13. Born in Philadelphia, Pa., on July 15, 1866, Mr. Brown started his business career in Chicago, with Marshall Field & Co. in 1884. Five years later he became associated with the McKinlock brothers as vice president and part owner of the Central Electric Co., one of the earliest and largest of the electrical wholesale organizations in the United States.

His experience there as a distributer of Okonite wires, cables, and tapes led to his joining The Okonite Co. in 1925 as executive vice president in charge of all sales through the Midwest. He had also been an Okonite director since 1919. During the same period, he was also a vice president and director of The Okonite-Callender Cable Co., Inc.

In 1943 at its annual meeting the National Electrical Manufacturers Association presented Mr. Brown with a citation and Fifty-Year Certificate because of his long and untiring service as a pioneer in the electrical industrry.

Active in many civic affairs, Mr. Brown had served on the board of governors of the Chicago Opera Co. and the directorate of the Chicago Boys' Clubs, Inc., of which he was president, 1938-40. At the time of his death he had been a trustee of the Chicago Music Foundation for seven years and a director of The Wacker Corp. for 12 years. Mr. Brown helped establish the Electric Club in Chicago and served as its president for many years. He was also a member of The Chicago, Old Elm Club, Shoreacres, and Onwentsia Golf clubs.

Mr. Brown is survived by his wife, two sons, and a daughter. One son, C. E. Brown, Jr., is also vice president of The Okonite Co. in charge of the Washington, D. C., office.

Mrs. E. O. Hutchens

MRS. EDWARD O. HUTCHENS, for many years secretary of Utility Mfg. Co., Cudahy, Wis., of which her husband is president, died last month in a Milwaukee hospital after a brief illness. She was born Sophie Scheffler in Appleton, Wis., 61 years ago. The deceased belonged to St. Luke's Episcopal Church, Order of the Eastern Star, the Ladies of Kenwood, and the Ladies of Ivanhoe. She leaves, besides her husband, a son, a grandchild, two brothers, and two sisters. Interment was in Wisconsin Memorial Park.

R. S. Leonard

RALPH S. LEONARD, assistant treasurer of The Firestone Tire & Rubber Co., Akron, died December 26 at his home after a long illness. Funeral services were held December 28 at the Church of Our Savior.

Educated in the Norwalk public schools, Denison University, and Ohio State University, Mr. Leonard came to Firestone in 1919.

He is survived by his wife, two sons, and two grandchildren.

During his residence in Akron, Mr. Leonard was active in church work, a leader of Boy Scout activities, a trustee of the YWCA, and prominent in men's clubs. He was past president of the Akron area council of Boy Scouts and active in the establishment of Camp Manitoc. He was a vestryman of the Church of Our Savior and a past president of the University Club.

George A. Smith, 59, a member of the Canadian government rubber inspection board, died January 15 in Toronto, Ont. Born in Kitchener, Ont., he was for many years with the B. F. Goodrich Rubber Co. of Canada, Ltd., in that city.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Belden Mfg. Co.	Com.	$0.30	Mar. 5	Feb. 17
Boston Woven Hose & Rubber Co	Com.	0.50	Feb. 26	Feb. 15
Crown Cork & Seal Co., Inc.	Com.	0.25	Jan. 30	Jan. 19
Crown Cork & Seal, Ltd.	Com.	0.50 q.	Feb. 15	Jan. 22
Dayton Ruober Mfg. Co.	Pfd. A	0.50 q.	Jan. 25	Jan. 10
De Vilbiss Co.	7% Pfd.	0.175 q.	Jan. 15	Dec. 30
Faultless Rubber Co.	Com.	0.25	Apr. 1	Mar. 15
Firestone Tire & Rubber Co.	4½% Pfd.	1.125 q.	Mar. 1	Feb. 15
General Cable Corp.	Pfd.	1.75 accum.	Feb. 1	Jan. 22
Goodyear Tire & Rubber Co.	Com.	0.50	Mar. 15	Feb. 15
Goodyear Tire & Rubber Co.	Pfd.	1.25 q.	Mar. 15	Feb. 15
Midwest Rubber Reclaiming Co.	Com.	0.50 q.	Feb. 1	Jan. 20
Midwest Rubber Reclaiming Co.	Pfd.	1.00 q.	Mar. 1	Feb. 17
Norwalk Tire & Rubber Co.	Pfd.	0.875 q.	Apr. 2	Mar. 15
Okonite Co.	Com.	1.50 q.	Feb. 1	Jan. 18
Okonite Co.	6% Pfd.	1.50 q.	Mar. 1	Feb. 15
Raybestos-Manhattan, Inc.	Com.	0.375	Mar. 12	Feb. 26
Tyer Rubber Co.	Pfd.	1.50 q.	Feb. 15	Feb. 1

Patents and Trade Marks

APPLICATION

United States

2,364,081. **Shock-Absorber for Mooring Lines, including a Flat Rubber Ring and Pulling Loops over the Inner Edges of the Ring.** G. P. Lambert, Stockholm, Sweden.

2,364,134. **Shoe Sole Composition Consisting of a Nubbed Fabric with a Filling of a Tough Elastic Plastic Material on One Side and a Different Plastic Material on the Other.** J. N. Dow, Longmeadow, Mass., and A. T. Dildilian, Suffield, assignors to Bigelow Sanford Carpet Co., Inc., Thompsonville, both in Conn.

2,364,157. **In Apparatus for Treating Woven Fabric, a Pair of Rollers at Least One of Which Has a Surface of Resilient Closely Spaced Ridges.** A. Mellor and R. J. Mann, Spondon, assignors to British Celanese, Ltd., London, both in England.

2,364,205. **A Gum Massaging and Tooth Polishing Appliance Having Rubber Massaging Elements.** L. L. Fuller, Edmonton, Alta., Canada.

2,364,427. **Toy Airplane Consisting of a Body and a Balloon for Sustaining the Body.** E. G. Dougherty, Fairhope, Ala.

2,364,678. **Sleeve Gasket of Elastic Sealing Material for a Cap for a Container.** P. O'C. White, assignor to White Cap Co., both of Chicago, Ill.

2,364,738. **In a Textile Decorating Composition, Aqueous Polyvinyl Alcohol as Dispersing Medium for the Pigment.** C. M. Marberg, Elmhurst, and E. K. Fischer, Long Island City, assignors to Interchemical Corp., New York, all in N. Y.

2,364,744. **Molded Heel Having a Body of a Cured Resin and Fibrous Material.** T. C. Morris, Belmont, assignor, by mesne assignments, to B. B. Chemical Co., Boston, both in Mass.

2,364,874. **Spring Tire for Vehicles.** M. Saldin, Brooklyn, N. Y.

2,364,903. **Paper Bag for Infusing Material, Having a Handle of Fibrous Material Coated with a Thermoplastic.** S. R. Howard, Milton, Mass., assignor to Pneumatic Scale Corp., Ltd., Quincy, Mass.

2,364,955. **Golf Ball.** W. H. Diddel, Indianapolis, Ind.

2,365,016. **Girdle Having a Body Portion of Pliable and Somewhat Elastic Thermoplastic Film Material to Which Is Bonded an Inner Layer of Stretchable Fabric.** A. N. Spanel, New York, N. Y.

2,365,019. **In an Insulated Electrical Conductor, a Glass Braid and Impregnated with a Baked, Heat-Stable Synthetic Resin.** H. J. Stewart, York, Pa., assignor to General Electric Co., a corporation of N. Y.

2,365,020. **Gummed Sheet Material Including a Paper Backing, an Exposed Dry Coating, and a Deformable Resinoid Filler.** C. W. Stillwell, assignor to Dennison Mfg. Co., both of Framingham, Mass.

2,365,048. **In Connecting Means for Conductors of Coaxial Electrical Transmission Lines, Annular, Resilient Sealing Means for the Coaxial Transmission Line.** W. A. Bruno, New Hyde Park, assignor to Bruno Patents, Inc., Long Island City, both in N. Y.

2,365,080. **Droppable Gasoline Tank.** M. W. Humphreys, Euclid, assignor to Ohio Rubber Co., Willoughby, both in O.

2,365,090. **In a Solenoid for Driving a Shuttle of a Loom, a Core Having a Head with Counterbore and a Rubber Plug in a Recess in the Counterbore.** S. Levine, Worcester, Mass.

2,365,148. **In Electric Resistance Welding Apparatus, a Normally Stationary Die and a Cooperating Die Mounted in a Movable Member by Means of Rubber Units; Each Unit Including Inner and Outer Metal Sleeves and a Body of Rubber Vulcanized to and between the Sleeves.** M. S. Clark, Warren, O., assignor to Federal Machine & Welder Co.

2,365,185. **For Humidifying a Tobacco Container, Sponge Rubber Body Backed with Thin Moistureproof Material, and Covered with a Thin Skin Having Small Vacuum Suction Recesses.** F. L. Gailey, Los Angeles, Calif.

2,365,219. **Means to Prevent Flashover in a Spark Plug, Including a Rubber Sleeve and a Sealing Washer Formed Integrally with the Sleeve.** J. J. Rose, Dayton, O.

2,365,251. **Wind Shield Cleaner.** R. D. Curtis, assignor to Trico Products Corp., both of Buffalo, N. Y.

2,365,279. **Pneumatic Track.** H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

2,365,296. **Inflatable Pessary.** M. E. Schimpf, St. Louis, Mo.

2,365,315. **In Making a Lace Fabric, the Use of a Support of a Polyvinyl Alcohol Film.** T. L. Williams, New York, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,365,351. **Flexible and Resilient Sealing Member in a Fluid Seal.** A. J. Matter, Park Ridge, assignor to Crane Packing Co., Chicago, both of Ill.

2,365,421. **Resilient Mounting.** H. C. Lord, assignor to Lord Mfg. Co., both of Erie, Pa.

2,365,457. **In a Dialysis Apparatus, a Framework Including Cell Skeleton Members, Each of Which Has a Rubber Gasket against One Face, and a Semi-Permeable Membrane against the Other Face.** F. K. Daniel, Kew Gardens, assignor to Hornkem Corp., New York, both in N. Y.

2,365,468. **Rubber Cylinders in Axial Alinement in a Tilting Chair Mounting.** W. F. Herold, Easton, assignor to Bassick Co., Bridgeport, both in Conn.

2,365,556. **Prophylactic Package.** F. G. Karg, Chicago, Ill.

2,365,574. **Annular Rubber Gasket in a Pipe Joint.** A. T. McWane, Birmingham, Ala., assignor to McWane Cast Iron Pipe Co., a corporation of Ala.

2,365,656. **Non-Metallic Protective Headgear Consisting of an Inflatable Hollow Framework on Which Is Arranged Insect-Excluding Material.** G. M. Lamsa, Philadelphia, Pa.

2,365,779. **Gas Mask.** M. C. Schwab, Chicago, Ill.

2,365,807. **Arch Support Including a Pair of Inflatable Air Bladders.** E. M. Dialynas, Canton, O.

2,365,947. **Nursing Bottle and Nipple.** H. H. Ganson, assignor to Hygeia Nursing Bottle Co., Inc., both of Buffalo, N. Y.

2,366,031. **Shorts with Two Removable Elastic Bands.** A. James, Melbourne, Victoria, Australia.

2,366,032. **Foundation Garment Having Elastic Sections.** H. L. Jasper, assignor to the La Resista Corset Co., both of Bridgeport, Conn.

2,366,138. **Rubber Heel.** D. M. Welch, assignor to O'Sullivan Rubber Co., Inc., both of Winchester, Va.

Dominion of Canada

424, 081. **Paper Bag Closure Consisting of a Thread Made Essentially of Polyvinyl Alcohol.** Columbian Rope Co., assignee of G. R. Beebe and A. W. Koon, all of Auburn, N. Y., U. S. A.

424,097. **In a Combined Auto Door Scuff Plate and Weather Strip, a Composite Weather Strip Having a Base of Resilient Material and Attached to the Outer Face of This Base a Sponge Rubber Bumper Strip.** Ford Motor Co. of Canada, Ltd., Windsor, Ont., assignee of C. F. Kramer, Birmingham, Mich., U. S. A.

424,103. **Tacky, Non-Hardening Insulation Tape Impregnated with a Liquid Including Polymerized Styrene or a Polymerized Substituted Styrene.** International Standard Electric Corp., New York, N. Y., U. S. A., assignee of A. A. New, S. G. Foord, and D. R. Beckwith, all of London, England

424,146. **Cushion Heel of Elastic Material in Which Is Embedded a Rigid, Heel-Shaped Core Having One Face Exposed.** United States Rubber Co., New York, N. Y., assignee of E. C. Uhlig, Greenwood, R. I., both in the U. S. A.

424,151. **Sleeve Gasket of Yielding Elastic Sealing Material for a Closure.** White Cap Co., assignee of W. P. White, both of Chicago, Ill., U. S. A.

424,172. **Paint Mask of Resilient Material for an Internal Cup-Shaped Gear.** J. E. Duggan, Birmingham, Mich., U. S. A.

424,173. **Paint Mask of Resilient Material, to Protect Working Surfaces of the Teeth of a Bevel Gear.** J. E. Duggan, Birmingham, Mich., U. S. A.

424,218. **In a Flax Thresher, a Pair of Rolls, the Upper Having a Rubber Surface.** Deere & Co., Moline, assignee of H. C. Thompson, East Moline, both in Ill., U. S. A.

424,231. **For Aircraft, a Composite Sheet-Like Product Consisting of Layers of Resin-Impregnated Wood Veneer Material.** B. F. Goodrich Co., New York, N. Y., assignee of A. A. Glidden, Watertown, and W. R. Hickler, Winthrop, both in Mass., both in the U. S. A.

424,234. **Fabric Selvage Containing Elastic Yarn.** Hemphill Co., Central Falls, assignee of E. St. Pierre, Pawtucket, both in R. I., U. S. A.

424,248. **Adhesive Sheet or Tape Having a Fibrous Backing Impregnated with a Polyacrylate Elastomer.** Minnesota Mining & Mfg. Co., assignee of H. J. Tierney, both of St. Paul, Minn., U. S. A.

424,434. **Gas Main Stopper Including an Elastic Diaphragm, and Spring Means and Bond Elements upon Which Is Molded a Coating of Flexible Material.** V. E. Ankarlo, Milwaukee, Wis., U. S. A.

424,473. **Waterproof Covering for a Piezoelectric Unit.** Brush Development Co., assignee of J. H. Ream, both of Cleveland, O., U. S. A.

424,497. **In a Dispensing Container for Pulverulent Material, Bellows Apparatus of Rubberized Crepe Paper.** Canadian Industries Ltd., Montreal, P. Q., assignee of J. W. Thomson, Vancouver, B. C.

424,499. **In an Electric Blasting Initiator, Wires Insulated with a Synthetic Linear Polyamide and a Plug of Rubber-Like Material.** Canadian Industries, Ltd., Montreal, P. Q., assignee of M. H. English, Pompton Lakes, N. J., U. S. A.

424,536. **For Finishing Wood Surfaces, a Heat-Hardenable Coating of a Mixture of Urea and Alkyd Resins.** Interchemical Corp., New York, N. Y., assignee of M. M. Wilson and W. E. Berry, both of Cincinnati, O., both in the U. S. A.

424,549. **In an End Closure for Shot Shells, the Use of Milled Cyclized Rubber Diluted with a Small Amount of Basic Amino Polymer to Secure a Thin Disk.** Remington Arms Co., Inc., Bridgeport, Conn., assignee of J. Harmon, Wilmington, Del., both in the U. S. A.

424,583. **Hardenable Resinous Compositions for Decorating a Fibrous Surface.** H. Freiberg, and S. Freiburg, assignee of H. Freiberg, both of London, England.

United Kingdom

565,181. **Elastic Wound Dressing.** Plastic Research & Development, Ltd., and K. Dubinski.

565,228. **Electric Cable.** British Insulated Cables, Ltd., J. C. Quayle, and H. B. Chapman.

565,319. **Electrical Insulated Wire.** Okonite-Callender Cable Co., Inc.

565,325. **Insulated Electrical Conductors.** British Thomson-Houston Co., Ltd. (General Electric Co.).

565,359. **Elastic Hosiery and Other Gaarments.** R. and J. Pickles.

565,392. **Inflatable Cores for Use in Casting Hollow Concrete Units.** C. B. Mathews and J. G. Ambrose.

565,477. **Vehicle Tire.** Firestone Tire & Rubber Co.

565,892. **Pneumatic-Tired Road Vehicles.** P. Howey.

PROCESS

United States

2,364,167. **Curing Tread Rubber on Tires.** H. A. Scott, Omaha, Nebr., assignor to Super Mold Corp. of California.

2,364,870. **Laminated Plastic Article with a Recess or Slot therein.** E. W. Otto, Los Angeles, Calif., assignor to Western Lithograph Co., a corporation of Calif.

2,364,962. **Joining Hollow Thermoplastic Articles.** H. W. Eagles, Erie, Pa., assignor to General Electric Co., a corporation of N. Y.

2,365,103. **Boots or Similar Articles of Footwear.** F. F. Olson, Sudbury, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,365,374. **Shaping Solvent-Free Organic Plastic Material by Extrusion through a Die of Substantial Length.** J. Bailey, West Hartford, assignor to Plax Corp., Hartford, both of Conn.

2,365,375. **Shaping Organic Plastic Material by First Placing It into Stuffer and Then Forcing the Material through the Stuffer into and through a Die.** J. Bailey, West Hartford, assignor to Plax Corp., Hartford, both of Conn.

2,365,637. **Rigid Domes from Organic Synthetic Thermoplastic Material in Rigid Sheet Form.** E. L. Helwig, Bristol, assignor to Rohm & Haas Co., Philadelphia, both in Pa.

2,365,670. **Heat Exchange Tubes.** E. H. Wallace, Detroit, Mich., assignor to United States Rubber Co., New York, N. Y.

2,365,814. **Rubber Floor Coverings.** J. L. Goudsmit, Nijmegen, Netherlands; vested in the Alien Property Custodian.

2,365,815. Building Pneumatic Tires. J. I. Haase, assignor to Wingfoot Corp., Akron, O.

Dominion of Canada

424,226. **Compact and Non-Porous Rubber Sheeting from Frothed Aqueous Dispersions of Rubber, Etc.** Dunlop Rubber Co., Ltd., London, assignee of E. W. Madge and F. T. Purkis, both of Birmingham, both in England.

424,495. **Continuous Process for Cold Drawing Polyamide Film.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. B. Taylor, Wilmington, Del., U. S. A.

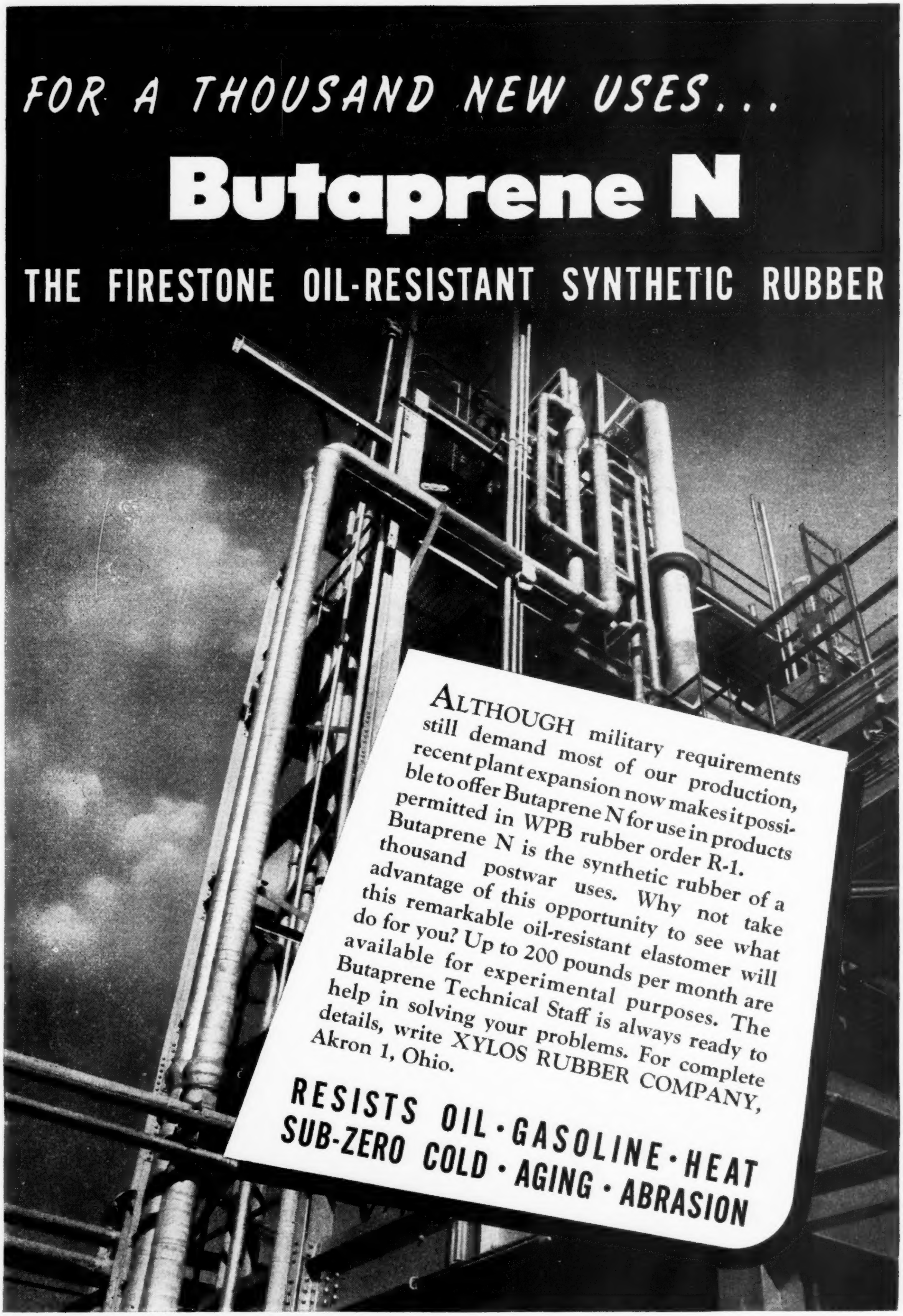
424,500. **Coating Surfaces with Solid Polythene.** Canadian Industries, Ltd., Montreal, P. Q., assignee of C. F. Flint and H. Taylor, both of Blackley, Manchester, England.

424,507. **Coating a Surface with Organic Thermoplastic Material by a Flame-Spraying Method.** Canadian Industries Ltd., Montreal, P. Q., assignee of M. L. Macht, Jersey City, and M. McK. Renfrew, Arlington, both in N. J., U. S. A.

United Kingdom

565,370. **Corrugated Thermoplastic Sheet Material.** F. Watson (Munters' Industri Aktiebolag).

565,801. **Shaped Articles from Polymerized Materials.** J. S. Byers, W. E. Gates, and Imperial Chemical Industries, Ltd.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Butaprene N
THE FIRESTONE OIL-RESISTANT SYNTHETIC RUBBER
ALTHOUGH military requirements still demand most of our production, recent plant expansion now makes it possible to offer Butaprene N for use in products permitted in WPB rubber order R-1. Butaprene N is the synthetic rubber of a thousand postwar uses. Why not take advantage of this opportunity to see what this remarkable oil-resistant elastomer will do for you? Up to 200 pounds per month are available for experimental purposes. The Butaprene Technical Staff is always ready to help in solving your problems. For complete details, write XYLOS RUBBER COMPANY, Akron 1, Ohio.
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CHEMICAL

United States

2,364,042. To Vulcanize Rubber, the Use of a Normal Amount of an Organic Accelerator Containing no Free Amines and an Amount of an Alkylene Polyamide between 50% and 500% in Excess of That Required to Activate the Accelerator. F. C. Bersworth, Verona, N. J., and M. Omansky, Brookline, Mass., assignors, by direct and mesne assignments, to Martin Dennis Co., Newark, N. J.

2,364,089. Condensation Product Consisting of Cyclized Rubber Reacted with Maleic Anhydride. J. A. Mitchell, Kenmore, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,364,091. Recovering Resins from Coal. A. Nagelvoort, Salt Lake City, Utah.

2,364,158. Condensation Product Consisting of Phenol-Rubber Product Reacted with Maleic Anhydride. J. A. Mitchell, Kenmore, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,364,172. Coating Composition Including a Vinyl Resin at Least Part of Which Is a Vinyl Halide Resin and a Minor Amount of a Soluble Condensation Product of Material of the Group of Urea, and Amino Triazines, with Formaldehyde and a Monohydric Alcohol. H. G. Stauffer, Drexel Hill, Pa., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

2,364,186. A Water-Miscible Liquid Product Obtained by Heating Together Natural Rubber and an Organic Amine. F. C. Bersworth, Verona, assignor to Martin Dennis Co., Newark, both in N. J.

2,364,204. Baked Heat-Darkened, Tough, Flexible, Substantially Infusible Polyamide Produced by Heating in the Presence of Oxygen a Body of Thin Cross-Section of a Synthetic Saturated, Linear Polyamide. C. S. Fuller, Chatham, N. J., assignor to Bell Teelphone Laboratories, Inc., New York, N. Y.

2,364,227. Polymerizing Vinyl Chloride in the Form of an Aqueous Emulsion in the Presence of a Dispersing Agent Soluble in Water, Selected from the Group of Salts of Pure Sulphonic Acids of Organic Compounds Containing at Least 8 Carbon Atoms and Salts of Sulphuric Acid Esters of Organic Compounds Containing at Least 8 Carbon Atoms and Then Isolating the Polymeric Material by Adding a Water-Soluble Lead Salt. J. R. Lewis, L. B. Morgan and J. T. Watts, all of Manchester, England, assignors to Imperial Chemical Industries Ltd., a corporation of Great Britain.

2,364,377. Preparing Butadiene by Pyrolizing Cyclohexane, Cooling the Reaction Vapors by Plunging into Water, Subjecting Uncondensed Vapors to Scrubbing with a Light Petroleum Oil, Compressing the Unabsorbed Vapors to 5 Atmospheres and Finally Recovering the Butadiene and Unconverted Cyclohexane by Distillation from the Cooling Water and Scrubbing Oil. A. E. Lawrence, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,364,382. Synthetic Rubber-Like Product Derived by Treatment with a Chloride of Sulphur of a Polymerized Isobutylene Having Molecular Weight above 1000. A. J. Morway, Roselle, N. J., assignor, by mesne assignments, to Jasco, Inc., a corporation of La.

2,364,387. Depolymerizing into Polymer-Forming Units, by Heating under Pressure in the Presence of Water, a Solid Synthetic Linear Polymer from the Class of Synthetic Linear Polyamides and Synthetic Linear Polyesters and Polymerizing the Polymer-Forming Units together with Different Polymer-Forming Units from the Class of Synthetic Linear Polyamide-Forming Units and Synthetic Linear Polyester-Forming Units. W. R. Peterson, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,364,398. Making 2-Mercapto-Thiazoline by Heating a Mixture of One Mole of Ethanol Amine and at Least 2 Moles of Carbon Disulphide at a Temperature of at Least 50°C. H. B. Stevenson, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,364,399. Preparing 2-Mercapto-Thiazoline by Reacting Ethanol Amine with at Least Two Molecular Proportions of Carbon Disulphide in a Closed Vessel under Superatmospheric Pressures at Temperatures in Excess of 75°C. I. Williams, Borger, Tex., B. M. Sturgis, Pitman, N. J., and J. J. Verbande, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,364,410. Chlorinated Polythene Containing from 0.1 to 5.0% of Sodium Lactate. D. Whittaker, Northwich, England, assignor to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,364,416. Separating Substantially Pure Thiophenols from "Acid Oils." G. W. Ayers, Jr., and M. S. Agruss, both of Chicago, and R. T. Bell, Deerfield, assignors to Pure Oil Co., Chicago, both in Ill.

2,364,589. Chemically Resistant Coating Films and Massive Bodies Consisting of at Least 55% Chlorinated Rubber and a Polymerization Product of an Ester of the Class of the Methyl, Ethyl, Propyl, and Methoxy and Ethoxy Substituted Methyl, Ethyl and Propyl Esters of Methacrylic and Acrylic Acid. J. W. Raynolds and M. R. Radcliffe, Easton, Pa., assignors to Raolin Corp., New York, N. Y.

2,364,593. Preparing N,N'-Diarylamidines. J. T. Thurston, Riverside, and D. E. Nagy, Stamford, both in Conn., assignors to American Cyanamid Co., New York, N. Y.

2,364,594. Preparing Acid Salts of Guanylthiourea. J. T. Thurston, Riverside, and R. L. Sperry, Stamford, both in Conn., assignors to American Cyanamid Co., New York, N. Y.

2,364,712. Condensation of a Phenol Free of Unsaturated Hydrocarbon Constituents and of the Class of Hydroxybenzene, Naphthol, Anthranol, and Their Homologs with an Alkyl Ether of a Phenol Having an Unsaturated Hydrocarbon Substituent, in the Presence of a Katenoid Condensing Agent. M. T. Harvey, East Orange, N. J., assignor to Harvel Research Corp., a corporation of N. J.

2,364,790. Promoting the Polymerization of Unpolymerized and Monomeric Organic Materials of High Dielectric Value by Dispersing Titanium Dioxide in the Organic Material and Exposing the Whole to an Energized Electrostatic High-Frequency Field. C. B. Hemming, Parlin, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,364,847. Rubber Cement for Flocked Fabrics, Consisting of a Dispersing Medium, a Mineral Filler of the Group of Calcium Carbonate, Calcium Silicate, and Hydrated Aluminum Oxide; and a Tough Thermoplastic Resin-Like Derivative of Rubber Reacted with a Phenol in the Presence of an Acid Catalyst. G. S. Hiers, Bala-Cynwyd, Pa., assignor to Collins & Aikman Corp., Philadelphia, Pa.

2,364,900. Composition Consisting of a Water-Soluble Formaldehyde-Hardenable Nitrogenous Body and a Water-Soluble Acetone Resin. F. A. Hessel, Upper Montclair, and J. B. Rust, Verona, both in N. J., assignors to Ellis-Foster Co., a corporation of N. J.

2,364,925. Producing Pentaerythritol. H. M. Spurlin, assignor to Hercules Powder Co., both of Wilmington, Del.

2,365,035. Accelerating the Polymerization of Haloprenes. M. A. Youker, Gordon Heights, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,365,121. Refining a Soluble-Fusible Phenol-Aldehyde Resin by Treating It, Dissolved in a Suitable Solvent, with Nascent Hydrogen in the Presence of a Small Amount of Water. W. N. Traylor, Hattiesburg, Miss., assignor to Hercules Powder Co., Wilmington, Del.

2,365,122. Refining a Modified Alkyd Resin by Treating It, Dissolved in a Suitable Solvent, with Nascent Hydrogen in the Presence of Water. W. N. Traylor, Hattiesburg, Miss., assignor to Hercules Powder Co., Wilmington, Del.

2,365,123. Refining a Coumarone-Indene Resin by Treating It with a Metal above Hydrogen in the Electromotive Series and an Acid Salt of a Polybasic Inorganic Acid from the Group of Sulphuric Acid and Phosphoric Acid in the Presence of a Small Amount of Water. W. N. Traylor, Hattiesburg, Miss., assignor to Hercules Powder Co., Wilmington, Del.

2,365,135. Improved Rutile Titanium Dioxide Pigments. R. W. Ancrum, Stockton-on-Tees, England, assignor to Titan Co., Inc., New York, N. Y.

2,365,264. Oxygen-Containing Organic Compounds from Olefins. W. H. Groombsbrudge and R. Page, both of Spondon, England, assignors to Celanese Corp. of America, a corporation of Del.

2,365,335. Vulcanized Hard Rubber Panel Substantially Devoid of Cold Flow and Capable of Being Bent without Cracking on Being Warmed, Composed of Rubber, Lime, Accelerator, Cured Phenolic Resin Powder, Hard Rubber Dust, and Sulphur. E. R. Dillehay, Glen Ellyn, Ill., assignor to Richardson Co., Lockland, O.

2,365,340. Process for Cleaving a Polymer of an N-Vinyl Imide of an Organic Dicarboxylic Acid. W. E. Hanford and H. B. Stevenson, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,365,400. Heat-Stabilized, Halogen-Containing High-Polymeric Substances of the Group of Chloro-Rubber, Chlorinated Butadiene Rubber, Polyvinyl Chloride, Chlorinated Polyvinyl Chloride and Polyas-Dichlor Ethylene; Containing an Addition of Sodium Carbonate and of a Member of the Group of Diphenyl-, Dinaphthyl- Ditolyl-, and Dichlor-Diphenylthiourea. H. Fikentscher, Ludwigshafen-on-the-Rhine, Germany; vested in the Alien Property Custodian.

2,365,405. Plastic Composition Resistant to Loss of Plasticity Which Includes an Anhydroformaldehyde-Arylamine and the Plastic Polymerizates Obtained by Subjecting Synthetic Rubber-Like Emulsion Polymerizates from the Group of Polymeric Butadiene-1:3-Hydrocarbons and Mixed Polymerizates of Butadiene-1:3 Hydrocarbons with Styrene, to an Oxidizing Treatment in the Presence of Free Oxygen and Antioxidants at an Elevated Temperature. E. Gartner, Cologne-Mulheim, and A. Koch, Cologne-Dunnwald, both in Germany; vested in the Alien Property Custodian.

2,365,431. Preparing N-Monochlorination Products of High Molecular Fatty Acid Amides. L. Orthner, Frankfurt a.M., and T. Jacobs, Wiesbaden, both in Germany; vested in the Alien Property Custodian.

2,365,506. Polymerizing a Chlorine-Substituted Ethylene in the Presence of a Water-Soluble Lead Salt of a Saturated Fatty Acid. A. H. Alexander, Cuyahoga Falls, and F. K. Schoenfeld, Silver Lake, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,365,508. Compositions of Finely Divided Cork Bonded with Thermoplastic Bonding Material. P. R. Austin, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,365,561. Reacting Chlorine, Carbon Disulphide, and a Compound from the Group of Saturated Acyclic, Saturated Alicyclic, and Aryl Substituted Saturated Aliphatic Hydrocarbons in the Presence of Actinic Light and Pyridine. M. S. Kharasch, Chicago, Ill., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,365,646. Fibrous Tape Impregnated with a Mixture Containing a Polymerized Aromatic Vinyl Hydrocarbon and a Monomeric Polymerizable Aromatic Hydrocarbon. A. A. New, S. G. Foord, and D. R. Beckwith, all of London, England, assignors to International Standard Electric Corp., New York, N. Y.

2,365,662. Separating Carbon Black from Reclaimed Rubber Stock by Intimately Mixing at Least 20% by Weight of Bentonite with the Stock, Then Extracting with a Rubber Solvent, While the Bentonite Prevents Removal of the Carbon Black by the Solvent. H. H. Thompson, assignor to Wingfoot Corp., both of Akron, O.

2,365,717. Polymer Obtained by Polymerization of a Conjugated Butadiene with a Mononitro Alkanol Diester of an Alpha Ethylenically-Unsaturated, Alpha, Beta-Dicarboxylic Acid. C. J. Mighton, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,365,808. Preparing Alpha, Beta-Dihalo-Aliphatic Carboxylic Acids by Halogenating a Nitrile of the Acrylic Series in an Acidic Medium. J. D. D'Ianni, assignor to Wingfoot Corp., both of Akron, O.

2,365,873. Adhesive Composition Consisting of Bentonite, Rubber Latex, Magnesium Chloride, Water-Soluble Soap and Preservative. J. J. Harris, Chicago, Ill.

2,365,912. Separating Normal Butane and a Beta Butylene. M. Souders, Jr., Piedmont, assignor to Shell Development Co., San Francisco, both in Calif.

2,365,950. Method of Obtaining Rubber from Goldenrod. J. W. Haefele, Ridgewood, and J. McGavack, Leonia, both in N. J., assignors to United States Rubber Co., New York, N. Y.

2,366,007. Treating Liquid Media to Remove Cations by Contacting Such Media with a Water-Insoluble Sulphonated Polymerizate of a Mixture of a Polyvinyl Aryl Compound and a Monovinyl Aryl Compound. G. F. D'Alelio, Pittsfield, Mass., assignor to General Electric Co., a corporation of New York.

2,366,008. Treating Liquid Media to Remove Anions therefrom by Contacting the Media with a Water-Insoluble Aminated Polymerizate of a Mixture of a Polyvinyl Aryl Compound and a Monovinyl Aryl Compound. G. F. D'Alelio, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,366,018. As Antioxidant for Rubber, a Compound of the Structure $R_1 — NH — R_2$ in Which R_1 Is an Aromatic Radical, and R_2 an Indan Radical Attached to the Nitrogen at the 5-Position; the Compound Is Free from Acidic Groups. C. F. Gibbs, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,366,025. Applying a Mixture of Urea Formaldehyde Glue with a Catalyst and Asbestos to a Surface of a Lignocellulosic Substance, and Applying Heat and Pressure to Produce an Integrally United Whole. H. W. Hall, Newton, Mass.

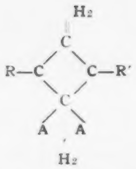
2,366,049. Resinous Composition, Useful as Alkali-Acidproof Cement, from Polyvinyl Butyral Dissolved in Furfuryl Alcohol. C. R. Payne and R. B. Seymour, both of Allentown, assignors to Atlas Mineral Products Co., Mertztown, both in Pa.

2,366,129. Water-Soluble Resin from Tetraethylenepentamine Heated with Boric Acid. J. B. Rust, Verona, N. J., assignor to Montclair Research Corp., a corporation of N. J.

Dominion of Canada

424,059. Plastic Compound Consisting of Lignin and One or More Materials of a Class Including Gluten, Rubber, Protein, and Casein. M. de B. Remy, Westmount, P. Q.

424,090. Antioxidant of the Probable General Formula:



Where R and R' Are Aryl Groups, at Least One of Which Is Further Substituted by an Aryl-Amino Group, and A Is an Aliphatic Group. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of P. T. Paul, Naugatuck, Conn., U. S. A.

424,105. **For a Pressure-Sensitive Adhesive, a Primer Consisting of Polyvinyl Alcohol in Combination with a Dispersion of a Rubber-Like Substance in an Aqueous Solution.** Johnson & Johnson, Ltd., Montreal, P. Q., assignee of H. J. Billings, South Acton, Mass., U. S. A.

424,210. **Preparing a Substitution Product of a Phenol by Reacting with an Olefinic Compound in the Presence of a Catalyst of an Oxy Compound of Boron and a Compound of the Formula ROOC — COOR', where R and R' Each Is a Member from the Group of Hydrogen, Alkyl Radicals, and Aryl Radicals.** Carbide & Carbon Chemicals, Ltd., assignee of Bakelite Corp. of Canada, Ltd., both of Toronto, Ont., assignee of V. H. Turkington, Mountain Lakes, L. R. Whiting, Woodbridge, and L. P. Rankin, Caldwell, all in N. J., U. S. A.

424,229. **Reclaiming Synthetic Rubber by Heating together a Mixture of a Swelling Agent, a Softening Agent, and a Vulcanized Polymer of 2-Chloro-1,3-Butadiene for Less Than Two Hours at a Temperature above 212° F.** Firestone Tire & Rubber Co., Akron, assignee of F. L. Kilbourne, Jr., Copley, both in O., U. S. A.

424,312. **Plasticizing Polyvinyl Chloride with a Mixed Ester of the General Formula R(XY)n, Where R Is the Residue of a Polyhydroxy Alcohol of the Group of Alkylene Glycols Containing 2-4 Carbon Atoms, Polyalkylene Glycols Containing 4-8 Carbon Atoms, Glycerol, and Pentaerythritol; X Is the Residue of Phthalic Acid; Y an Alkyl Group Containing not More Than 8 Carbon Atoms; and n Represents the Integers 2, 3, and 4.** American Cyanamid Co., New York, N. Y., assignee of E. R. Meincke, Stamford, Conn., both in the U. S. A.

424,313. **Plasticizing Polyvinyl Chloride with a Mixed Ester of the General Formula R(XY)n, Where R Is the Residue of a Polyhydroxy Alcohol of the Group of Alkylene Glycols Containing 2-4 Carbon Atoms, Polyalkylene Glycols of 4-8 Carbon Atoms, Glycerol and Pentaerythritol; X Is the Residue of 3,6 Endomethylene-Δ-4,5-Tetrahydrophthalic Acid; Y Is an Alkyl Group of not More Than 8 Carbon Atoms; and n Represents the Integers 2, 3, and 4.** American Cyanamid Co., New York, N. Y., assignee of E. R. Meincke, Stamford, Conn., U. S. A.

424,329. **Composition Including the Product of Polymerization of a Vinyl Ester of a Halo-Phenoxy Substituted Aliphatic Monocarboxylic Acid.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Pittsfield, Mass., U. S. A.

424,490. **Heat-Stable Composition Containing a High Average Molecular Weight Polymerized Vinyl Chloride Mixed with a Mercaptide.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. R. Lewis, L. B. Morgan, and W. McG. Morgan, all of Blackley, Manchester, England.

424,491. **Heat Stable Composition Containing a High Average Molecular Weight Polymerized Vinyl Chloride Mixed with a Metal Salt of 2:4 Dihydroxyquinoline; the Metal Is from the Group of the Alkali Metals, Lead and Zinc.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. R. Lewis, L. B. Morgan, and W. McG. Morgan, all of Blackley, Manchester, England.

424,492. **Sealing Composition Including an Organic Film-Forming Polymer Vehicle and Activated Vegetable Carbon.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. T. Hucks, South River, N. J., U. S. A.

424,512. **Moistureproofing Paper by Means of a Coat of Wax Dispersed in a Solution of a Water-Insoluble Vinyl Resin in a Solvent Which Does not Dissolve the Wax** Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of R. W. Quarles, Pittsburgh, Pa., and A. K. Doolittle, South Charleston, W. Va., both in the U. S. A.

424,514. **Surgical Adhesive Dressing Having a Film Containing a Plasticized Polyvinyl Resin Prepared from Polyvinyl Alcohol and an Alcohol from the Class of Acetaldehyde, Formaldehyde and Butyraldehyde, with a Coating of Adhesive Applied to the Film.** A. De St. Dalmas & Co., Ltd., assignee of S. W. Atherley, both of Leicester, England.

United Kingdom

565,349. **Titanium Oxide Pigment.** E. I. du Pont de Nemours & Co., Inc.

565,350. **Fiber-Forming Polyamides.** E. I. du Pont de Nemours & Co., Inc.

565,368. **Terpene-Modified Phenolic Resin.** I. Rosenblum.

565,474. **Synthesizing Aldehydes and Lactones.** National Oil Products Co.

565,774. **Fatty Acids, Aldehydes, Ketones, and Alcohols from Waste Cellulose Products.** W. C. Fairweather (E. Gutzwiller & Co.).

565,813. **Cyano Esters and Derivatives Thereof.** Wingfoot Corp.

565,868. **Sponge Rubber.** United States Rubber Co.

MACHINERY

United States

2,364,242. **Tire Spreader.** W. G. Prentice, Indianapolis, Ind.

2,364,435. **Apparatus for Forming Films by Extrusion of Molten Polymer.** H. D. Foster, Wilmington, Del., and A. W. Larcher, Mendenhall, Pa., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,364,911. **Apparatus to Repair Leaks in Rubber Railway Hose.** J. A. Osella, Roseville, Calif.

2,365,326. **Apparatus to Form Continuous Sheets of Organic Plastics Material.** J. Bailey, West Hartford, assignor to Plax Corp., Hartford, both in Conn.

2,365,341. **Tire Building Apparatus.** U. C. Haren and V. H. Hasselquist, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

2,365,404. **Tire Splitter.** L. B. Gamel, Lemay, Mo.

2,365,764. **Apparatus for Stripping Non-Skid Automobile Tires from Molds.** E. C. Kastner, Fairlawn, assignor to Akron Standard Mold Co., Akron, both in O.

2,365,952. **Machine for Continuously Making a Flexible, Helicoidal Structure from a Plastic Tape.** A. W. Hanson, assignor to Dow Chemical Co., both of Midland, Mich.

Dominion of Canada

424,091 and 424,092. **Film-Drawing and Trimming Machine.** Dow Chemical Co., assignee of F. E. Dulmage, both of Midland, Mich., U. S. A.

424,160. **Latex Dialysing Apparatus.** Gouvernements Landbouwbedrijven, assignee of H. R. Braak, both of Batavia-Centrum, Java.

424,243. **Apparatus for Assembling Tire Strips.** Lee Rubber & Tire Corp., Conshohocken, assignee of J. C. Carlin, Norristown, both in Pa., U. S. A.

424,306. **Machine for Molding Hollow, Screw-Threaded Articles from Plastic Material.** C. S. Pfeilsticker, Rockledge, Pa., U. S. A.

424,495. **Apparatus for Cold Drawing Films of Synthetic Linear Polymer.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. B. Taylor, Wilmington, Del., U. S. A.

424,523. **Apparatus for Continuously Preparing Rubberized Tire Fabric.** Firestone Tire & Rubber Co., assignee of G. L. Bruggemeier and W. T. Runals, both of Akron, O., and B. J. Humphrey, New Haven, Conn., both in the U. S. A.

United Kingdom

565,344. **Apparatus and Process for Insulating Electric Wires and Cables.** J. W. Dalgleish and Pye, Ltd.

565,453. **Apparatus for Cutting Discarded Pneumatic Tire Covers into Strips for Subsequent Utilization.** E. G. Mascarenhas.

565,783. **Fluid-Pressure Operated Tools.** Rubber Bonders, Ltd., H. E. Z. Gordon, and N. Beck.

UNCLASSIFIED

United States

2,364,173. **Spring Wheel.** E. Stift, St. Louis, Mo.

2,364,211. **Apparatus for Inflating and Deflating Pontoons, Etc.** A. N. Gustafson,, assignor to Schramm, Inc., both of West Chester, Pa.

2,364,384. **Tire Buffing Lathe.** A. R. Oakes, Monrovia, Calif., assignor to J. F. Brown, Los Angeles, Calif.

2,364,461. **Dispensing Device for Adhesive Tape in Roll Form.** P. S. Madsen, Bethany, assignor to Seamless Rubber Co., New Haven, both in Conn.

2,364,973. **Tapping Knife.** W. O. Hansen, Caracas, Venezuela.

2,365,017. **Hose Clamp.** V. E. Sprouse, Columbus, Ind.

2,365,109. **Tire Casing Clamp.** A. Ridd, Louisville, Ky.

2,365,328. **Shield for Protecting an Air Scoop.** M. R. Bell, Los Angeles, Calif., assignor to B. F. Goodrich Co., New York, N. Y.

2,365,339. **Viscometer for Liquid and Plastic Materials.** H. Green, assignor to Interchemical Corp., both of New York, N. Y.

2,365,617 and 2,365,618. **Dual Wheel Assembly.** C. S. Ash, Milford, Mich.

2,365,747. **Detachable Hose Coupling.** I. Cowles, Detroit, Mich., assignor to Irving Cowles and R. W. Lotz, both of Chicago, Ill., successor co-trustees to Union Bank of Chicago, Ill.

2,366,067. **Hose Coupling.** F. E. Smith, South Dartmouth, Mass.

Dominion of Canada

424,098. **Tire Bead Locking Ring.** B. F. Goodrich Co., New York, N. Y., assignee of F. Herzegh, Shaker Heights, O., U. S. A.

424,232. **Tire Bead Lock** B. F. Goodrich Co., New York, N. Y., assignee of F. Herzegh, Shaker Heights, O., U. S. A.

424,367. **Carboy Box.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. W. Nygren, Naugatuck, Conn., U. S. A.

424,389. **Hydraulic Pressure Transmitting Fluid Non-Injurious to Rubber Parts.** Puritan Soap Co., Rochester, N. Y., assignee of R. R. Fulton, Pittsburgh, Pa., U. S. A.

424,416. **Tool for Cutting Circular Plugs from Resilient Material.** Western Electric Co., Inc., assignee of Bell Telephone Laboratories, Inc., both of New York, N. Y., assignee of R. J. Kent, Summit, N. J., both in the U. S. A.

United Kingdom

565,239. **Hose Pipe Connector.** Aerolex, Ltd., and F. B. Harley.

565,449. **Device for Stretching Rubber and Other Flexible Tubing or Hollow Members, for Binding, Insulating, Marking, and Other Purposes.** Hellermann Electric, Ltd., and A. C. Anselmi.

TRADE MARKS

United States

404,029. Representation of an inner tube crossed by the words: **"Puncture-Seal."** Liquid tire sealing compound. Radiator Specialty Co., Charlotte, N. C.

404,034. **Judy Lee Debs.** Footwear. H. Tash, doing business as Tash Shoe Co., Hamilton, O.

404,323. **Durables for the Duration.** Footwear. Selby Shoe Co., Portsmouth, O.

404,226. **Speed-Flex.** Power transmission belts. Gates Rubber Co., Denver, Colo.

404,474. **Griptred.** Plastic tread materials for floors, etc. Goodyear Tire & Rubber Co., Akron, O.

404,634. **Inner-Seal.** Weather stripping. Bridgeport Fabrics, Inc., Bridgeport, Conn.

404,635. **Bellows.** Fluid seals and machine packings. Crane Packing Co., Chicago, Ill.

404,697. **Dora Miles.** Corsets, etc. Dora Miles Co., Branford, Conn.

404,706. **Spencer.** Footwear. Spencer Shoe Corp., Boston, Mass.

405,237. Word: **"Rated"** between graduated triple lines. Rainwear, footwear, and other articles of clothing. Allied Stores Corp., Wilmington, Del., doing business as Bon Marche, Seattle, Wash., Dey Bros. & Co., Syracuse, N. Y., and Quackenbush Co., Paterson, N. J.

405,238. **Big and Little Sister.** Footwear. Reider Shoe Mfg. Co., Schuylkill Haven, Pa.

405,239. **Bootmaker Guild.** Footwear. Freeman Shoe Corp., Beloit, Wis.

405,247. **Sarazin.** Corsets, garter belts, etc. D. Bickum and K. Sarazin, both of New York, N. Y.

405,249. **Dorothy Fields.** Girdles, etc. Fields Shops, Inc., New York, N. Y.

405,241. **Philadelphian's.** Footwear. Pearl Shoe Co., Philadelphia, Pa.

405,399. **Youngchap.** Raincoats, etc. Harry Myers & Co., Inc., Baltimore, Md.

405,985. **Kantslip.** Ice grippers for footwear. L. A. Priess, Minneapolis, Minn.

406,304. **Representation of a man superimposed on a broken circle surrounded by the word: "Harlem's"** and below a representation of a name plate containing the words: **"Top-Notchers."** Raincoats, etc. L. Eisenstein, New York, N. Y.

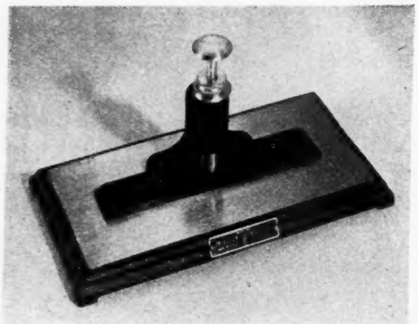
406,311. **Florgard.** Wax for rubber and other floors. Acme Chemical Co., Milwaukee, Wis.

406,372. **Draftite.** Weather stripping. W. P. Hilger, doing business as Hilger Co., assignor to B. H. Flanagan and M. H. O'Link, doing business as Stearns Mfg. Co., all of St. Cloud, Minn.

406,507. **Richmond.** Tires. Richmond Rubber Co., Inc., Richmond, Va.

406,508. **Safety-Speed.** Tires. Richmond Rubber Co., Inc., Richmond, Va.

New Machines and Appliances



Needle Jig Fixture

Punch Device for Rubber Test Specimens

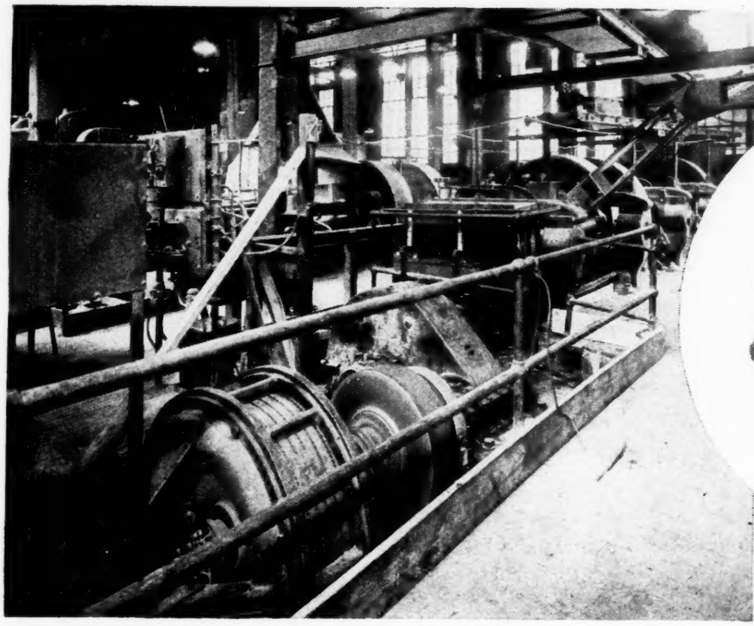
A NEEDLE jig fixture for producing a uniform hole in a test specimen of rubber prior to flexing in the De Mattia machine for determination of cut-growth resistance consists of a small brass base and a support for the needle holder. A self-contained spring returns the holder to its original position. A conveniently sized knob on the top is depressed to produce the puncture in the rubber specimen. The base is finished with Kem-Resist and chromium. Precision Scientific Co., 1750 N. Springfield Ave., Chicago 47, Ill.

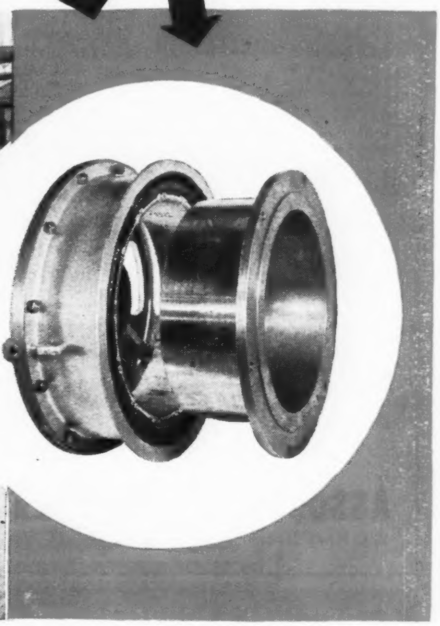
Filtration Process

FILT-R-STIL, a process by which tap water can be transformed into the chemical equivalent of distilled water, utilizes melamine-derived and other resins. Water is passed through beds of these ion exchange resins which transform the dissolved salts in the water to the corresponding acids and in turn absorb the acids. The final demineralized water has an average salts content as low as two parts per million of calcium carbonate. The process also removes dissolved carbon dioxide from the water.

Filt-R-Stil is made in different sizes and capacities to meet various requirements. The large portable unit illustrated has a capacity of two to three gallons of mineral-free water a minute. A laboratory size has a capacity of three gallons an hour, and a smaller portable unit produces eight to ten gallons an hour. Special permanently installed sizes are available for

Give your Rubber Mills a "Brake"





With this new and modern Clutch and Brake by Fawick, you can STOP the largest rubber mill QUICK—before damage is done to either equipment or operator. It more than fulfills all safety requirements.

And you can START the mill with equal efficiency, through positive control of torque by a cushion of air, in a gland of rubber and fabric.

The Fawick Airflex Clutch grips like a tire grips the road. A cushion of air absorbs shocks and vibration. There are no toggles, springs or levers—nothing to adjust, nothing to lubricate. Maintenance costs are unusually low.

The Fawick Airflex Clutch is designed for both new mills, and for quick and easy replacement on existing mills.

Write us today for details and engineering recommendations.

FAWICK AIRFLEX COMPANY, INC.
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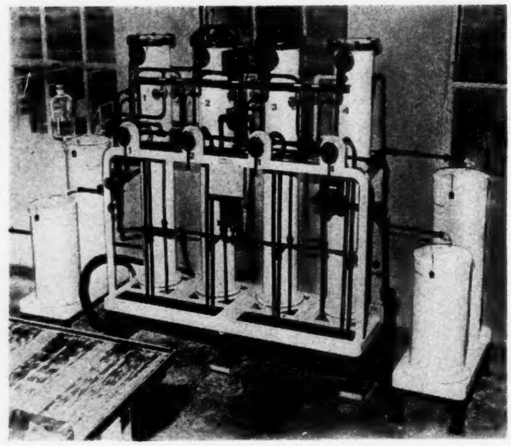
In Canada, Renold-Coventry Ltd., Montreal, Toronto, Vancouver

In Britain, Crofts Engineers, Ltd., Bradford, England

FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR



Filt-R-Stil

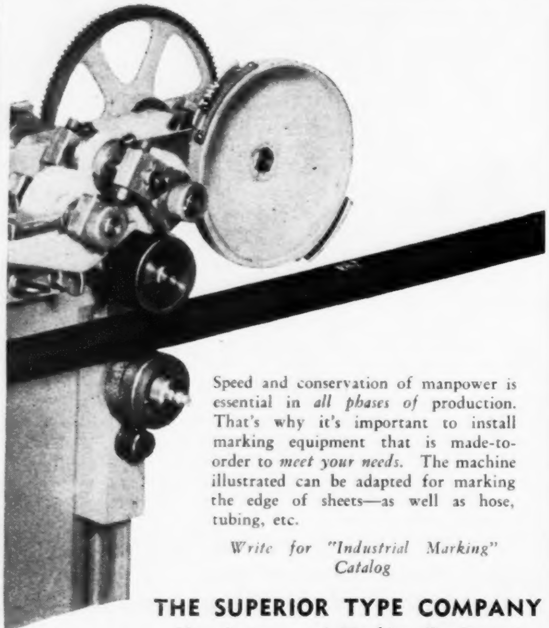
large industrial users, such as synthetic rubber plants, textile mills, and oil refineries.

In the laboratory and larger sized units four beds of alternate cation and anion exchange resins in Pyrex glass columns are connected by an intricate piping system. As the water passes over the first bed, dissolved salts are transformed to the corresponding acids, which are absorbed in the second bed. The third bed picks up any dissolved salts which have leaked through, and the fourth absorbs the remaining acids as well as removes the carbon dioxide. The small units are equipped with cartridges of ion exchange resins which are renewable when exhausted. The large units are equipped with a system for the reactivation of the ion exchange resins, and with electronic controls which indicate when the effluent water is mineral free. American Cyanamid & Chemical Corp., Rockefeller Plaza, New York, N. Y.

Water Analysis Apparatus

THE Aero-Titrater, for the determination of hardness, calcium, and magnesium in industrial and potable waters is said to be widely applicable in the process industries. It is now manufactured for civilian use after three years of army field and laboratory service. A new endpoint, based on the foam-meter principle, is reported to be unmistakable and reproducible with a high degree of precision. Determinations are made within 10 minutes, and there is no waiting time to observe stability of lather. False endpoints are absent, and air agitation eliminates tedious shaking by hand. The accuracy is said to be comparable with lengthy gravimetric methods. The ratio of calcium and magnesium present does not affect the determination; there is a single endpoint for stoichiometrically equivalent quantities of calcium and magnesium, regardless of the relative amounts present. The titrater can be used with samples which contain chlorides up to 2,000 ppm., and sulphates up to 1,000 ppm. Large iron concentrations, and treating and conditioning chemicals used in boiler water do not interfere. Samples of 50 milliliters or less are required. The instrument is supplied calibrated and ready for assembly and use. All vital parts are of durable plastic construction. Chief Chemical Corp.

Aero-Titrater



EUROPE

GREAT BRITAIN

Nationalization of the Rubber Industry

Those present at the thirty-fifth annual meeting of the Kampong Kuantan Rubber Co., held last November, heard the chairman, E. D. Money, recommend that the rubber plantation industry offer itself for nationalization to the British and United States governments. This rather startling suggestion was evidently prompted by the pessimistic feeling engendered by the progress of synthetic rubber in America, where output is greater than prewar imports of natural rubber.

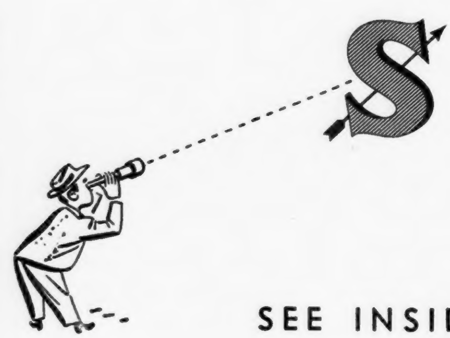
To show how seriously the rubber plantation industry is being threatened by synthetic rubber, Mr. Money pointed to the protest of certain United States Senators against the exploratory talks arranged among Great Britain, Netherlands, and the United States. The Senators, it was emphasized, appear to believe that the United States is now independent of foreign supplies and could safely ignore the future of the plantation industry. Mr. Money recommended nationalization of the rubber plantation industry as a constructive policy, and he expressed the fear that the alternative would be that the industry would be allowed to drift until it was "shepherded into a convoy under government control, but without guarantee of remunerative working."

New Education Scheme of I.R.I.

Funds from the Federation of British and Allied Manufacturers' Associations made it possible for the new Education Scheme of the Institution of the Rubber Industry to operate at least partially the beginning of the year. This scheme aims to provide educational facilities of a national and progressive character to persons in the rubber industry; while an Education Fund offers financial assistance to both part-time and full-time students.

Two courses of study are envisaged: one qualifies a student for the Licentiateship Diploma (L.I.R.I.), and the other, for the Associateship Diploma (A.I.R.I.). The former is primarily designed for part-time students and those who have entered the industry direct from school, but is so arranged that students of high ability may use it as a step toward the Associateship. It normally covers 550 hours, spread over three years, and includes training in elementary chemistry, physics, and rubber technology and rubber science. The course, when completed, qualifies a student for at least a subordinate position of trust in the factory.

The Education Fund enables assisting at least 30 students for the Licentiateship to pay the cost of tuition fees, books, fares, etc., by means of bursaries of 5 to £10 a year, renewable yearly to students who make satisfactory progress. In exceptional cases larger grants will be made, and extra amounts are also available in cases where local arrangements for practical training are in-



SEE INSIDE BACK COVER

adequate and it becomes necessary for students to take a three-week vocational course at a rubber school.

To be eligible for the Associateship a student must have attended a three-year full-time post-school-certificate course of study at a senior rubber school, or must have attended part-time courses for a minimum of two years after passing the Licentiateship examination. The part-time courses are divided into pure science and rubber technology and rubber science. Since admission as an Associate "implies a high standard of training in the scientific and technical principles of rubber manufacture and allied subjects," Associates are qualified for control positions in the industry.

Financial assistance takes the form of scholarships of 40 to £90 a year for full-time courses at a senior rubber school. Bursaries, as for Licentiateship students, will also be awarded, and additional grants also will be made to assist students to take short vocational courses in cases where they are unable to obtain facilities for practical training in their own districts.

Two prizes will be made available each year on the results of the examinations of the Licentiateship as well as the Associateship examinations, in each case for 5 and £2 respectively.

Hitherto the study courses offered by the Institution of the Rubber Industry have been confined almost entirely to the scientific and technical aspects of the rubber industry. But it is now proposed to provide courses also for the operative and administrative side of the rubber industry. A sub-committee appointed by the council has been considering the matter and has been in contact with the Ministry of Labor and National Service, which already has a system of training courses for foremen and other supervisors. The new courses, to be offered free to suitable candidates, will cover: outline of factory organization; cooperation between departments; qualities of successful foremen; the handling of workers; the production system; workshop conditions; standardization and inspection; payment and incentives; factory costing; factory legislation; wartime legislation; general resume and discussions.

Trade Associations for Postwar Industry

The need of a certain control of imports and exports to keep Britain's international account in balance and the attainment of a national policy of full employment are two important features of the postwar situation that will call for maximum versatility and enterprise on the part of business and cooperation between industry and Government as soon as the war is over. With this in view, a committee of the Federation of British Industries under the chairmanship of Sir Charles Bruce-Gardner recommended in a report on organization of British industry that the various industries should be organized through trade associations which could be taken into consultation by the government. Among the more important functions of the associations would be: to act as the official channel of communication between industry and government on matters of commercial or economic policy; to assist in solving the problems that arise when production and consumption get out of step or are dislocated by trade-cycle fluctuations; to maintain fair conditions of trading and to regulate trade practices within the industry; to enable the industry to negotiate on equal terms with its opposite numbers in other countries; to encourage individual and promote cooperative research; to promote the technical and general knowledge of those engaged in the industry; and to assist in the improvement of service to the customer and of quality, design, methods of production and to promote where suitable the standardization of products and parts of products.

British Rubber Industry Notes

To encourage employes who are taking part-time study courses Dunlop Rubber Co., Ltd., will grant special money prizes to those who have successfully passed examinations at any one of 16 educational institutions, including the Institution of the Rubber Industry. The educational bodies for which awards have been announced include such as specialize in accountancy, secretarial and commercial work, general science, engineering, and transport.

In the House of Commons on December 14, 1944, the Minister of Production was asked what progress had been made in the production of synthetic rubber in England and in particular whether the British company which had obtained a permit in 1943 had begun production. The reply was that there was as yet no commercial output of synthetic rubber in the country and that the plant of the company in question was still under construction.

A special airplane tire designed to prevent shimmy is now being built at Fort Dunlop. The tire, which has only two heavy tread ridges in contact with the ground when landing, is the invention of Major O. J. Marstrand of the Royal Aircraft Establishment,

Farnborough, and is said to withstand hundreds of landings successfully; whereas ordinary tires may be worn out after a few landings as a result of "shimmy." The tire is being made in 12 sizes for various aircraft.

The following price reductions in synthetic rubbers, effective November 15, 1944, were announced by the Ministry of Supply Rubber Control: GR-M, from 3s. per pound to 2s.9d. per lb. (delivered factory); Perbunan, from 4s, 6½d, to 2s.9d. per lb. (delivered factory); Hycar OR-15 from 4s, 6½ per pound to 2s.9d (delivered factory).

In reply to a question in the House of Commons on November 10, 1944, it was revealed that by agreement between the government concerned committees composed of United Kingdom, United States, and Netherlands members, representing both civil and military departments, have for some time been working on plans for organizing the purchase and shipment of rubber from the enemy-occupied territories in the Far East during the initial period after liberation by the forces of the United Nations.

SWITZERLAND

Before the war Switzerland annually used several tons of rubber in the form of tires for passenger cars and bicycles. The yearly consumption of truck tires alone came to about 2,500 tons. Since then the tire situation, as elsewhere, has become progressively more critical so that in the Spring of 1944 an order, originally issued in March, 1942, prohibiting the use of solid tires on public roads, was rescinded, and about the same time all unmounted pneumatic tires and tubes were requisitioned. A stock-taking early last year showed that the country would need 1,500 metric tons of old rubber for reclaiming, but it also revealed that there was little likelihood that this amount would actually be collected. Bicycle tires, to the number of 25,000, were reported to be available; some of these are made from reclaimed rubber; others from a new substitute called "Platosyn."

Thrown more and more on its own resources by the war, Switzerland has been forced to undertake the manufacture of many commodities formerly imported and to expand the manufacture of others, including various materials and solvents used in the production and processing of varnishes, lacquers, and rubber. At least one Swiss firm has also begun to make synthetic resins and adhesives from them.

As was to be expected, the chief difficulty is the shortage of basic raw materials, and apparently the dye industry suffered most on this account.

The reports of chemical companies for 1943 nevertheless showed satisfactory development in that year. The Society of Chemical Industry, Basel, known as Ciba, produced various kinds of synthetic resins marketed under the names Cibanit, Cibanoid, and Melopas, from which are made articles for the electrical-engineering trade, for use in the construction of radio apparatus, as well as for household and other purposes. These goods seem to be gaining in popularity, and business in 1943 was gratifying. The so-called Melocol adhesives made from synthetic resins also did well.

Synthetic adhesives are finding increasing use in the woodworking industry as binders in various industries, especially the cork industry, and as a core-binding material in iron foundries. Various synthetic resin preparations have found their way into the textile-finishing trade to finish fabrics, for cementing, delustering, and improving quality; also in the lacquer industry, and to a limited extent for impregnating and stiffening purposes for footwear.

ITALY

In the course of investigations of flex-failure in polyvinyl chloride slabs it was observed that the tensile strength was much greater in the direction of calendering than across it, reported G. de Simone[1]. This point suggested that during calendering the long molecular chains in the film aline themselves in the calender direction producing a "grain" effect which must be taken into consideration in the various applications of the material, and more particularly in its use for shoe soling. Apparently this observation had already been made in Germany, for there polyvinyl

[1] *Materie Plastiche*, 9, 41-43 (1943).

chloride soling material has an arrow printed on it to indicate the line from toe to heel, that is, the calender direction.

Flexing tests of strips of plasticized non-loaded polyvinyl chloride cut with and across the "grain" revealed that while tearing commences after almost the same period of time in either direction, there is a marked difference in the period of time from the onset of cracking to complete break. Thus while it took an additional 4,320 minutes, after the onset of cracking, for strips cut across the "grain" to break completely, it required 7,800 minutes more to break with-grain strips completely.

The above findings lead to the conclusion that polyvinyl chloride has definite advantages over rubber for use as soling material and for other products subject to severe flexing demands. Oxidation is largely responsible for flex-failure of rubber; but polyvinyl chloride has almost complete resistance to oxidation, and as has been shown, if attention is given to calender grain, it yields a material that has good resistance to flexing, especially if loading fillers can be omitted. Furthermore polyvinyl chloride is easily calendered, and the sheets and slabs can be embossed or printed at the same time; vulcanization is not necessary, and finally, waste, damaged pieces, etc., can be used again without the need of reclaiming.

U. S. S. R.

Guayule plantings in Azerbaidzhan are said to be yielding nine times as much pure rubber per acre as *kok-saghyz.* The local soil and climate seem to be particularly well suited to the cultivation of guayule, and farmers have been encouraged to grow it. According to latest reports, a factory to process the rubber was started in this territory and should have been completed by February 1, 1945.

AFRICA

Despite increased labor difficulties in French Equatorial Africa rubber exports from this territory rose 12% during the first four months of the 1944-45 season.

Exactly one year late, the *Journal Official* of French West Africa of October 9, 1943, reached Washington. In this journal was published an order of September 18, 1943, effective October 1, 1943, whereby a Rubber Service under the Direction General of Economic Services was established in French West Africa to replace the Office for Distribution and Conditioning of African Rubber, created February 22, 1943. The new service is to make a survey of rubber sources, control all operations from production to exportation, assure improvement in the qualities of native rubber, devise measures for developing production, and give technical instruction to collectors of native rubber in Africa.

FAR EAST

CEYLON

Just a few years ago the International Rubber Regulation Committee was urging planters to cut out older and poorer yielding trees and replant with modern, high-yielding material, and at the time the comparatively meager response of planters caused disappointment, if nothing more. Now, however, that the Allies have only Ceylon to fall back on for the major part of their natural rubber supplies, the cutting out of any tree capable of bearing latex is forbidden by the terms of the Government of Ceylon's recently issued Defense Regulations. Only under special conditions and by special license granted by the Rubber Controller may a tree be felled, and even then it must first be made to yield as much latex as possible by the exhausting tapping methods known as slaughter-tapping.

The Defense Regulations also forbid the adulteration of latex except under special permit. Thus without government sanction no substance may be included in the latex except such as are usually added in preserving latex or producing sheet rubber: water, ammonia, formalin, sodium sulphite and bisulphite, acetic acid, formic acid, and paranitrophenol.

Unduly wet weather in the latter part of September hampered tapping and was at least to some extent responsible for the failure of local producers to fill their quota in the third quarter of 1944. Taking the unfavorable weather into consideration, the United Kingdom Ministry of Supply agreed to grant producers an extra 15 days to make up the deficit in the quota. If this had not been done, the Ceylon price for smoked sheet would have been reduced from 1.05 rupees to 71 cents for October 1, 1944, by which time the quota should originally have been filled.

INDIA

India was able to fill her rubber quota for the six months April 1 to September 30, 1944, when nearly 9,000 tons of rubber were supplied. The country's annual basic tonnage was fixed at 16,000 tons, and the quarterly quotas vary from just under 3,000 tons to more than 5,000 tons.

Editor's Book Table

BOOK REVIEWS

"Seeing the Invisible." The Story of the Electron Microscope." Gessner G. Hawley. Alfred A. Knopf, Inc., 501 Madison Ave., New York, N. Y. 1945. Cloth, 7½ by 5 inches, 204 pages. Price $2.50.

This simplified and personalized account of the development and use of the electron microscope was admittedly written to interest laymen. Only the most essential scientific principles are introduced, and these are thoroughly explained in nontechnical language. The details of the construction and operation of the instrument are briefly given, but the principal concentration is on the electron microscope's applications to current and future problems of practical interest. Some attention is given to its use in carbon black investigation and research on synthetic rubber and natural and synthetic latex. There are more than 70 illustrations and a number of simple diagrams which help to make clear the scientific principles involved.

"Formaldehyde." J. Frederic Walker. American Chemical Society Monograph Series. Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 1944. Cloth, 9¼ by 6 inches, 397 pages. Price $5.50.

No single book dealing with formaldehyde has heretofore been available in the English language. This one, by J. Frederic Walker of the chemical research division, electrochemicals department, E. I. du Pont de Nemours & Co., Inc., fulfills the need of such a book created by the growing importance of formaldehyde as a commercial chemical. It covers production methods; the physical and thermodynamic properties of the simple monomer, formaldehyde solutions, and polymers; chemical properties and reactions with various types of inorganic and organic chemicals; analysis; and industrial applications. A chapter is also given to hexamethylene tetramine, which is industrially important as a special form of formaldehyde.

The use of formaldehyde in the handling of rubber latex, the production of crude rubber, the preparation of rubber derivatives, and the synthesis of rubber accelerators and antioxidants is briefly treated. Its potential applications as a raw material in the synthetic rubber industry for the synthesis of dienes is pointed out, and the reaction of sulphur and alkali-metal sulphides with formaldehyde to obtain rubber-like materials is described. The value of formaldehyde in the production of solvents and plasticizers is also discussed. For security reasons new wartime uses of formaldehyde are not disclosed.

"Varnish Constituents." H. W. Chatfield. Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. 1944. Cloth, 8½ by 5½ inches, 496 pages. Price $7.

This volume, previously published in England, reviews the im-

portant developments of recent years in varnish materials and manufacture. It discusses in detail the properties, sources, production, and uses of varnish oils, acids, natural and synthetic resins, solvents and diluents, plasticizers, driers, antioxidants, asphalts and pitches, and waxes. One chapter describes the uses of latex and raw, molten, vulcanized, and oxidized rubber in varnish. More briefly considered are isomerized, hydrogenated, peracetylated rubber, and rubber resins. The discussion of synthetic rubbers as varnish constituents is limited to the "Thiokols." Another chapter discusses the mechanism of halogenation, the manufacture of chlorinated rubber from latex, from solid rubber, and rubber solutions, and its properties and uses. Brief mention is allotted fluorinated rubber and rubber hydrochloride.

"Fats and Oils. An Outline of Their Chemistry and Technology." H. G. Kirschenbauer. Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 1944. Cloth, 9¼ by 6 inches, 154 pages. Price $2.75.

The essential facts relating to the origin, methods of extraction, chemistry, and the processing of the commercially important vegetable and animal fats, oils, and waxes are briefly presented in a direct clear-cut manner in this small volume. Among other tables is one giving the characteristics of more than 150 fats and waxes. A lengthy bibliography is appended.

NEW PUBLICATIONS

"The Compounding of GR-S Latex Type No. 3." Booklet No. 6A. R. T. Vanderbilt Co., Inc., 230 Park Ave., New York 17, N. Y. 8 pages. The data presented in this laboratory report show the properties imparted to GR-S latex by certain accelerators, antioxidants, fillers, and vulcanizing dispersions. Suggested compounds are given for hard rubber from GR-S latex, and for commercial GR-S latex mixtures for rug backing, upholstery backing, combining, and canvas glove coating.

"Neoprene Sponge." Report No. 44-1. L. S. Bake. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 32 pages. This booklet discusses the compounding, processing, blowing, and the specific properties of neoprene sponge rubber. The information contained therein should enable a manufacturer to prepare with a minimum of effort neoprene sponge having various preselected properties.

"Hercules Products." Hercules Powder Co., Wilmington, Del. 36 pages. Cellulose chemicals, rosins and modifications, rosin esters and synthetic esters, terpene solvents and chemicals, explosives, blasting supplies and sporting powders, and other Hercules products used in 50 different industries are discussed in this booklet. An indication of many postwar applications for these chemicals in adhesives, plastics, paints, film, textiles, and paper is given.

"Struthers Wells Northmaster Kneading Machines." Struthers Wells Corp., Titusville, Pa. 16 pages. Construction data and available optional features and tables of standard sizes and capacities of mixing chamber and blade types of Northmaster kneading machines are given in this comprehensive bulletin. Laboratory, standard, and heavy-duty units of this precision machinery for mixing, kneading, and processing a wide range of materials including synthetic rubber are described.

"Announcing Antisol." Herron Bros. & Meyer, 82 Beaver St., New York 5, N. Y. 4 pages. The physical properties of Antisol, a wax for imparting resistance to atmospheric cracking of synthetic rubbers, and of cured stocks in which varying amounts of it have been incorporated are given in this leaflet. Four per cent. of Antisol is recommended for maximum protection against atmospheric cracking.

"20th Anniversary." Givaudan-Delawanna, Inc., 330 W. 42nd St., New York 18, N. Y. 16 pages. The December, 1944, issue of *The Givaudanian* commemorates 20 years of achievement in the aromatic chemical industry in the United States. Givaudan products used in war and in essential industries are featured.

Publications of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. **"Neozone Standard and Neozone C as Stiffening Agents for GR-I and GR-S,"** Report BL-182, 2 pages; **"The Effect of Metallic Lead on Neoprene Cements,"** Report BL-183, 2 pages; **"Neoprene Latex Adhesives,"** Report BL-184, 10 pages; **"Hardness Testing of Vulcanized Elastomers,"** Report BL-185, 8 pages; **"Polyac in GR-I Tire Curing Bags,"** Report BL-186, 2 pages; **"Heat Resistant GR-S Stocks,"** Report BL-188, 8 pages.

"Symposium on Plastics." American Society for Testing Materials, 260 S. Broad St., Philadelphia 2, Pa. Paper, 200 pages. Price $1.75. The 16 technical papers comprising this symposium provide extensive information on the properties and uses of phenolic, urea, melamine, allyl, polystyrene, cellulose, nylon, methacrylate, and rigid and non-rigid vinyl plastics. Much of the data is presented in condensed form in 130 figures and 62 tables. There are several extensive bibliographies.

"How to Maintain Electric Equipment in Industry." General Electric Co., Schenectady, N. Y. 1943. Cloth, 10¾ by 8¼ inches, 372 pages. Indexed. Price $1.75. The diverse information in this volume is intended to assist industrial plants in obtaining maximum performance and long life from GE equipment through proper upkeep. The suggestions are general in nature and do not replace specific instructions furnished by the company with its equipment. Cable and wire, battery trucks, diesel-electric locomotives, electric furnaces, industrial control, electronic control, instruments, lighting, motors and generators, turbines, welders, regulators, switchgear, and other equipment are covered by the manual. There are about 500 illustrations and many new tables and previously unpublished charts. All the recommendations were prepared by design, application, and field engineers.

"The Molecular Weights of Rubber and Related Materials. V. The Interpretation of Molecular Weight Measurements on High Polymers." G. Gee. Publication No. 50. The British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts., England. 10 pages. This paper presents a theoretical justification for the osmotic method for determining the molecular weights of high polymers and also indicates the conditions under which the viscosity method is advisable. The author concludes that unless an ultra-centrifuge is available, absolute molecular weight determinations must be based ultimately on osmotic data. Viscosity measurements furnish a convenient method of interpolation and give reliable results for homogeneous, linear polymers, but without fractionation, molecular weight data cannot furnish reliable information on molecular weight distribution.

"Chemical Engineering Catalog 1944-45." Twenty-ninth Annual Edition. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. 1580 pages. This catalog is primarily a source of information to manufacturers and their sales agents. The products of more than 600 firms are listed under two headings—equipment and supplies, and chemicals and materials. There are also a trade name index and a section with brief descriptions of selected technical publications.

"Industrial Alcohol." Report No. 2, War Changes in Industry Series. United States Tariff Commission, Washington, D. C. 52 pages. Because the postwar status of the alcohol industry may be materially affected by the size of the synthetic rubber industry and the methods by which synthetic rubber is made, the postwar future of the synthetic rubber program is of fundamental importance to producers of industrial alcohol. This report discusses the various factors including synthetic rubber which will likely govern alcohol production and consumption after the war.

"Channel Black Witcarb Mixtures in GR-S." Report 44-4. Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. 20 pages. This booklet discusses the range of properties attainable by various blends of channel black and Witcarb (calcium carbonate) which are suggested as practical replacement alternatives for SRF or thermatomic blacks in GR-S. Combinations of higher elongation and lower modulus with constant loadings at any given tensile obtained by use of these pigments are often superior to the properties imparted by pure SRF or thermatomic blacks. These pigments, therefore, serve to extend GR-S and to lower compound cost.

"Marbon S and S-1 Resins." Marbon Corp., Gary, Ind. 8 pages. This booklet lists some of the properties and applications of two heat plasticizers and organic fillers, Marbon S and S-1, when blended with GR-S. The recorded data indicate superior mechanical and electrical properties for wire insulation compounds.

"The Society of the Plastics Industry 1944-1945 Directory." Society of the Plastics Industry, Inc., 295 Madison Ave., New York 17, N. Y. 1944. 248 pages. Price $2.50 to non-members. This comprehensive directory lists more than 400 United States, Canadian, and foreign companies engaged in molding, extruding, fabricating, and laminating plastics and in manufacturing plastics material and machinery. Officers, addresses, and products are given. There is also a lengthy "Who's Who in Plastics" and classified product, material, and machinery indexes.

"Foreign Commerce and Navigation of the United States for the Calendar Year 1941." Bureau of the Census, United States Department of Commerce, Washington, D. C. Indexed. 696 pages. For sale by the Superintendent of Documents, Washington, D. C. Price $2.75. War restrictions delayed publication of the 1941 annual report of the foreign commerce of the United States. As in previous years, the report covers imports and exports by articles, countries, and customs districts. Figures for rubber and substitutes, rubber articles, and rubber chemicals are included.

"Resistoflex Protective Clothing, Featherweight and Heavy Duty." Resistoflex Corp., Belleville, N. J. 16 pages. This illustrated catalog describes gloves, aprons, head coverings, smocks, and sleeve guards of "Compar," a solvent-proof transparent derivative of basic polyvinyl alcohol resins. It affords protection against dermatitis, folliculitis, oil, grease, and dust. The catalog also describes a compound which makes shoes impervious to oils and solvents, and it includes a section on cleaning, maintenance, and repair of Resistoflex garments.

"Labors of War for Peace." Hercules Powder Co., Wilmington 98, Del. 44 pages. **"Plasticizers** for Adhesives, Surface Coatings, Plastic Molding Compounds, Elastomers, Flexible Sheeting, Synthetic Rubber." Carbide & Carbon Chemicals Corp., New York 17, N. Y. 16 pages. **"Truck-Bus Handbook."** The Tire & Rim Association, Inc., Akron 8, O. 44 pages. Price $1. **"Inspected Electrical Equipment, Supplement to May, 1944, List."** November 1944. Underwriters' Laboratories, Inc., Chicago 11, Ill. 36 pages. **"History's Lesson to Air Power."** P. W. Litchfield, Goodyear Tire & Rubber Co., Akron 8, O. 20 pages. **"America's New Opportunities in World Trade."** National Planning Association, Washington 6, D. C. 84 pages. Price 50c. **"Summary of Silver Anniversary Forum on the Future of Industrial Research."** Frank A. Howard, Standard Oil Development Co., New York 20, N. Y.

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Market Reviews

COTTON & FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Nov. 25	Dec. 30	Jan. 6	Jan. 13	Jan. 20	Jan. 27
Mar. ..	21.68	22.07	22.18	22.20	22.01	21.62
July ..	21.52	21.70	21.80	21.82	21.51	21.06
Oct. ..	20.80	20.08	20.96	21.20	20.70	20.36
Dec. ..	20,70	20.60	20.90	21.15	20.65	20.28
Jan. ..	....	20.58	20.84	21.09	20.66	20.24
Mar. ..	....	20.49	20.75	21.02	20.55	20.12

THE upward trend in domestic cotton prices that began late in November continued to mid-January. Then a downward movement got under way, which was attributed to favorable war news. Uncertainty in some quarters over developments in Washington concerning future cotton prices also stimulated liquidation. The 15/16-inch spot middling price of 22.52¢ on January 6 rose to 22.59¢ on January 10, declined to 22.31¢ on Janaunry 20, and closed at 22.07¢ on January 30.

The Census Bureau reported that cotton consumed in December totaled 760,740 bales of lint and 120,498 bales of linters, against 836,541 bales of lint and 122,305 bales of linters in November, and 851,180 bales of lint and 107,368 bales of linters in December, 1943. Indicated stocks of cotton in all hands December 31 were 17,835,000 bales, compared with 16,851,000 bales a year earlier, according to the New York Cotton Exchange. Nearly 40% of Brazil's anticipated record crop was lost because of lack of rainfall, and it is generally agreed that the destruction will eliminate that country as a factor in the world market. The National Cotton Council recently disclosed that a meeting of the International Cotton Advisory Committee will be called soon to discuss the possibilities of an international trade agreement.

Fabrics

Trading in the wide industrial gray cotton cloth market has almost ceased to exist. Negotiations between buyers and sellers have been discontinued, and all dealing is channeled on the basis of almost invariable directives or rating priorities. This sort of selling is likely to remain in force for some time. Osnaburgs and sheetings are moving in large part directly to the government and to the bag trade.

Print cloths in nearly all constructions are going to the military. The market situation is simply that there are no goods to sell except on the very highest of priorities. Raincoat manufacturers report a heavy demand for all types of raincoats, particularly the better grades, but mills who supply the fabrics have little or nothing to offer the civilian trade.

In contrast to WPB estimates, production of broad-woven cotton goods is expected by textile leaders to decline from 3% to 5% from the last quarter of 1944 to a total of about 2,350,000,000 linear yards.

"The outlook for a general improvement in production is bleak," C. T. Murchison, president of the Cotton Textile Institute, asserted early in January.

Total employment in the textile industry has fallen from the peak of 510,000 in 1942 to 424,000 in October, 1944, he said.

The WPB reported that 1944 cotton goods production was slightly under 10,000,000,000 linear yards, 1,000,000,000 linear yards under the 1942 all-time peak. Loom conversion required by the government for essential military production has resulted in increased scarcities of wide industrial gray goods.

Amendment 27 to MPR-127 permits inclusion of the gray duck ceiling price for finished duck fabrics delivered after January 2, 1945, if the material was put into the finishing process or sold before December 6, 1944. Cotton duck production was reported up 6% in December above November totals, but an additional 3% increase was held necessary to meet January schedules.

The rayon tire cord program, scheduled to produce at the rate of 240,000,000 pounds annually by the middle of the year, falls short at present of filling the heavy-duty tire needs of the Army. Units producing viscose fiber are expected to be utilized in the tire cord program. This changeover to the manufacture of filament yarn for tires will cut deeply into production of rayon staple fiber for civilian uses. The output of viscose tire yarn in 1944 was something over twice the 1943 total.

New York Quotations January 23, 1945

Drills		
38-inch 2.00-yard	yd.	$0.195
50-inch 1.52-yard		.29
52-inch 1.85-yard		.23875
52-inch 2.20-yard		.20511
59-inch 1.85-yard		.25202
Ducks		
38-inch 2.00-yard S.F.	yd.	.22875
40-inch 1.45-yard S.F.		.30172
51½-inch 1.35-yard D.F.		.33875
72-inch 1.05-yard D.F.		.45476
Mechanicals		
Hose and belting	lb.	.3975*
Tennis		
51½-inch 1.35-yard S.F.	yd.	.33148
51½-inch 1.60-yard D.F.		.29218
Hollands — Rubber		
20-inch	yd.	.1225/.145
30-inch		.22 /.2575
40-inch		.245 /.29
Osnaburgs		
36-inch 2.94 Cl.	yd.	.1271
40-inch 2.11 P.W.		.1623
40-inch 2.65 Cl.		.1408
40-inch 3.65 Cl.		.10946
Raincoat Fabrics		
Cotton		
Bombazine 64 x 60, 5.35	yd.	.135
Bombazine 64 x 56, 5.50		.1325
Print cloth, 38½-inch, 64 x 60.		.09439
Sheeting, 40-Inch		
48 x 48, 2.50-yard	yd.	.172
64 x 68, 3.15-yard		.14761
56 x 60, 3.60-yard		.12638
44 x 40, 4.25-yard		.10352
Sheetings, 36-Inch		
48 x 44, 5.00-yard	yd.	.091
40 x 40, 6.15-yard		.07398
Tire Fabrics — Karded Peeler		
Builder		
17¼ ounce 60" 23/11 ply	lb.	.48
Chafer		
14 ounce 60" 20/8 ply	lb.	.48
9¼ ounce 60" 10/2 ply	lb.	.45
Cord Fabrics		
23/5/3, 1 1/16" cotton	lb.	.44
15/3/3, 1 1/16" cotton	lb.	.42
12/4/2, 1 1/16" cotton	lb.	.42
23/5/3, 1¼" cotton	lb.	.44
Leno Breaker		
8¼ ounce and 10¼ ounce 60"	lb.	.45

* Basis.

American Viscose Corp. has protested to OPA the ceiling price of 43¢ a pound for 1,100 denier high-tenacity rayon tire cord yarn established under MPR 167. This price, the rayon firm contended, does not permit anything like a fair profit. Small businesses in the rubber industry, the brief presented to the OPA said, are forced to pay 62¢ a pound for tire fabric; whereas large rubber companies are able to twist and weave their own fabric from artificially priced low-cost yarn at a tremendous advantage.

For the first quarter of 1945, WPB has allotted for industrial, commercial, and rubber uses 112,561,000 linear yards of cotton broad-woven fabrics against 115,317,000 yards in the last quarter of 1944.

SCRAP RUBBER

DEMAND for rubber scrap in January was said to exceed the visible supply. Tubes were reported to be in noticeably short supply, and the red grades scarcer than the black. Scrap rubber accumulations are slow in coming out. Because tires for civilians are a more remote possibility than was previously thought, those who have tires are not discarding them. A good part of the scrap that would normally reach dealers is being used for tire retreading and repair work. Inclement winter weather has also retarded collections. Another factor contributing to retarded collections is the contamination of natural rubber scrap with synthetic materials. The difficulty of identification is reported to cause considerable hardship to collector and dealer. The scrap dealers anxiously await action on the part of reclaimers to overcome this difficulty.

Prices were held down on split parts for some time because the supply was greater than the demand for them. This supply is now rapidly disappearing, and prices have been adjusted to the ceilings. Peelings are quoted at less than ceilings. Everything else commands the ceiling price.

Scrap Rubber Ceilings

Inner Tubes†	¢ per Lb.
Red passenger tubes	7½
Black passenger tubes	6¾
Truck tubes	6½
Tires‡	$ per Short Ton
Mixed passenger tires	20.00
Beadless passenger tires	26.00
Mixed truck tires	20.00
Solid tires	36.00
Peelings†	
No. 1 peelings	52.25
2 peelings	33.00
No. 1 light colored (zinc) carcass	57.75
Miscellaneous Items*	
Air brake hose	25.00
Miscellaneous hose	17.00
Rubber boots and shoes	33.00
Black mechanical scrap above 115 sp. gr.	20.00
General household and industrial scrap	15.00

† All consuming centers except Los Angeles.
‡ Akron only.
* All consuming centers.

RECLAIMED RUBBER

THE demand for reclaimed rubber in January was considerably greater than

in the preceding months. The trade is of the opinion that 1945 will be an outstanding year in the reclaim industry. At present, manpower shortages in reclaiming plants are a limiting factor on production. Tube reclaims are reported to be in short supply, and carcass reclaims are in demand as substitutes. Rubber manufacturers are said to find reclaim a satisfactory replacement for smoked sheets in some applications. In the postwar years reclaim may continue to be used instead of crude rubber in such items as industrial tapes.

Amendment 6 to RPS 56—Reclaimed Rubber—and Amendment 1 to Supplementary Service Regulation 35 to Revised MPR 165, both effective January 15, permits a rise of ¼¢ a pound in manufacturers' maximum prices of reclaimed rubber. The increase is also permitted on charges for the service of processing scrap rubber furnished by the buyer into reclaimed rubber.

Reclaimed Rubber Prices

	Sp. Grav.	¢ per Lb.
Auto Tire		
Black Select	1.16-1.18	7 / 7¼
Acid	1.18-1.22	8 / 8¼
Shoe		
Standard	1.56-1.60	7½ / 7¾
Tubes		
Black	1.19-1.28	11¾/12
Gray	1.15-1.26	12½/13½
Red	1.15-1.32	12½/13
Miscellaneous		
Mechanical blends	1.25-1.50	5 / 6

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Rims Approved and Branded by The Tire & Rim Association, Inc.

Rim Size	Dec., 1944
15" & 16" D.C. Passenger	
16x4.00E	58,354
16x4.25E	4,217
16x4.50E	29,044
15x5.00E	3,052
16x5.00E	2,976
15x5.00F	16,749
16x5.00F	1,177
16x5.50F	3,389
17" & Over Passenger	
18x2.15B	3,327
Flat Base Truck	
20x4.33R (6")	54,660
15x5.00S (7")	10,732
20x5.00S (7")	405,214
15x5.50S	7,503
20x5.50S	13,457
20x6.00T (8")	36,044
22x6.00T (8")	7,458
20x7.33V (9/10")	71,569
22x7.33V (9/10")	8,735
24x7.33V (9/10")	11,067
19x8.37V (11")	399
20x8.37V (11")	693
Semi D. C. Truck	
16x4.50E	357
Tractor & Implement	
12x2.50C	4,648
15x3.00D	8,575
16x3.00D	2,799
19x3.00D	8,300
18x5.50F	10,498
24x8.00T	4,579
32x8.00T	416
36x8.00T	343
W8-24	9,105
W8-32	2,441
W10-28	1,463
W10-38	20
W11-26	554
DW8-28	724
DW8-38	2,284
DW9-38	4,311
DW10-38	6,058
TOTAL	817,291

Fixed Government Prices*

	Price per Pound: Civilian Use	Price per Pound: Other Than Civilian Use
Balata		
Manaos Block	$0.38¾	$0.38¾
Swinam Sheet	.42½	.42½
Guayule		
Guayule (*carload lots*)	.17½	.31
Latex		
Normal (*tank car lots*)	.26	.43½
Creamed (*tank car lots*)	.26¾	.44¼
Centrifuged (*tank car lots*)	.27¾	.45¼
Heat-Concentrated (*carload drums*)	.29½	.47
Plantation Grades		
No. 1X Ribbed Smoked Sheets	.22½	.40
1X Thin Pale Latex Crepe	.22½	.40
2 Thick Pale Latex Crepe	.22	.39½
1X Brown Crepe	.21⅜	.38⅞
2X Brown Crepe	.21⅛	.38⅝
2 Remilled Blankets (Amber)	.21¼	.38¾
3 Remilled Blankets (Amber)	.21⅛	.38⅝
Rolled Brown	.18	.35½
Synthetic Rubber		
GR-M (Neoprene GN)	.27½	.45
GR-S (Buna S)	.18½	.36
GR-I (Butyl)	.15½	.33
Wild Rubber		
Upriver Coarse (crude)	.12⅝	.26⅛
(washed and dried)	.20¼	.37¾
Islands Fine (crude)	.14⅝	.28¼
(washed and dried)	.22½	.40
Caucho Ball (crude)	11⅝	.29¾
(washed and dried)	.19½	.37
Mangabiera (crude)	.08½	.19¾
(washed and dried)	.18	.35½

* For a complete list of all grades of all rubbers, including crude, balata, guayule, synthetic, and latex, see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)
Allow nine words for keyed address.	**Address All Replies to New York Office at 386 Fourth Avenue, New York 16, N. Y.**	*Replies forwarded without charge*

SITUATIONS OPEN

OPPORTUNITY FOR INDUSTRIAL REPRESENTATIVE

A progressive middlewest Rubber Product Manufacturer, making extruded and molded products, has an excellent opportunity for a representative now calling on industrial concerns with other lines. A clean-cut, ambitious man can make good money in an exclusive territory on a commission basis. Write for an opportunity in your city, giving details concerning yourself.

Address Box No. 45,
Care of INDIA RUBBER WORLD

TIRE CURING FOREMAN—Good opportunity for experienced foreman capable of supervising production in pot heaters and individual vulcanizers. Offers attractive postwar as well as present-day opportunity. Eastern concern. Address Box No. 31, care of INDIA RUBBER WORLD.

TIRE FINISHING SUPERVISOR—Must have experience in supervising all duties connected with cured tire final finishing. Excellent opportunity for advancement with postwar security. Located in Pennsylvania. Address Box No. 32, care of INDIA RUBBER WORLD.

TUBE ROOM SUPERINTENDENT—Must have thorough knowledge of all phases of inner tube manufacture. Opening offers excellent opportunity to man with initiative and ability. Plant located in Pennsylvania. State all qualifications first letter. Address Box No. 33, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, PERMANENT; MILL ROOM AND COMPOUNDING experience, particularly synthetics; excellent prospects for advancement. Write for interview giving pertinent details. Address Box No. 34, care of INDIA RUBBER WORLD.

RUBBER CHEMIST. COLLEGE GRADUATE IN CHEMISTRY or Chemical Engineering with compounding experience desired for laboratory research and development work on compounding and evaluation of synthetic rubbers by large oil company located in New York area. In reply give age, education, experience, and salary expected. Our own employes have been informed of the appearance of this advertisement. Address Box No. 35, care of INDIA RUBBER WORLD.

GRADUATE CHEMIST WITH EXTENSIVE EXPERIENCE IN synthetic resin coatings, saturants, and adhesives. Must be well grounded in formulation of hot melt, solvent, and water phase mixes. Excellent opportunity with a progressive established New England Manufacturer of synthetic rubber and resin coatings and cements. Address Box No. 37, care of INDIA RUBBER WORLD.

WANTED: RUBBER COMPOUNDER AND ENGINEER, PREFerably on hose or belts by Rubber Manufacturer located in Eastern Pennsylvania. Essential job at present, with excellent postwar future. Please give full details as to experience, qualifications, salary desired, etc., in first letter. Statement of Availability necessary. Address Box No. 42, care of INDIA RUBBER WORLD.

SPREADING ROOM FOREMAN

with experience in general proofing.

Suburban Boston Area. Permanent postwar position. Must be able to furnish Certificate of Availability.

ADDRESS BOX NO. 910, Care of INDIA RUBBER WORLD.

SITUATIONS OPEN (Continued)

CHEMIST. TO DIRECT RESEARCH AND DEVELopment. Must have sound experience in pressure-sensitive adhesives, rubber, synthetic elastomers, resins, compounding techniques. Knowledge of paper coating desirable. Successful laboratory, administrative experience essential. The man we are looking for is probably now engaged as research director, or assistant, of a progressive, industrial laboratory and is seeking an opportunity for postwar advancement. Do NOT call in person; for further details write H. W. Sterne, Vice President, 79 Cleveland Street, Orange, New Jersey.

INDUSTRIAL AND MECHANICAL ENGINEERS FOR PROMInent midwestern rubber manufacturing concern. Excellent postwar opportunities. Address Box No. 38, care of INDIA RUBBER WORLD.

WANTED: MOLDING ENGINEER EXPERIENCED IN COMpression molding of synthetic rubber or plastics, to contact suppliers and customers, and to reorganize and expand molding department for war and postwar applications. Address Box No. 48, care of INDIA RUBBER WORLD.

RUBBER PRODUCTION MAN—TO SET UP SMALL MOLDED and extruded goods plant in Kentucky; select necessary machinery; must know compounding of present-day synthetics. Good opportunity with established firm who is expanding facilities. Address Box No. 49, care of INDIA RUBBER WORLD.

SITUATIONS WANTED

RESEARCH EXECUTIVE: EXCELLENT BACKGROUND ON RUBber, latex products, and organic chemicals. Valuable administrative experiences in diverse technical fields. Now separated from military service. M.S. Organic Chemistry M.I.T. Age 49. Four dependents. Protestant. Available immediately. Postwar opportunity essential. Location immaterial. Address Box No. 40, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER, HAVING 10 YEARS' EXPERIENCE WITH one well-known rubber company in compounding, factory processing, testing, and product development of synthetics, desires change because of personal reasons. Excellent references can be furnished from present employer. Address Box No. 44, care of INDIA RUBBER WORLD.

SUPERINTENDENT WITH 25 YEARS' EXPERIENCE IN MANUfacture of mechanicals, solid and sponge, from reclaim, natural, and synthetic rubbers, desires new connections. Capable compounder and development engineer. Can estimate costs and provide manufacturing specifications. Have been employed by large and small concerns. Address Box No. 47, care of INDIA RUBBER WORLD.

(Classified Advertisements Continued on Page 624)

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—24x24" Hydraulic Press with 14" dia. ram. 1—18x18" Hydraulic Press with 10" dia. ram. 1—Royle No. 4 Perfected Tuber, with Variable Speed D.C. Motor. 3—30x24' Hydraulic Presses with 12" dia. rams. 1—5'x20' High Pressure Vulcanizer, 250 lbs. pressure, quick-opening door, with Seeley controls and all auxiliaries. 4—W. & P. Mixers, up to 625 gal. cap. 1—Allen No. 3 Tuber. 10—High-Pressure Hydraulic Pumps, up to 6,000 GPM. Dry Powder Mixers, Pulverizers, etc. Send for complete list. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 7, N. Y.

"V" BELT MACHINERY
COMPLETE BELT-MAKING EQUIPMENT
Building Machines, Cutters, Slitters, Wrappers, Measuring Machines, Trimmers, Expanding Mandrels, Cord Latexers, and Driers. HOWE MACHINERY CO., INC., 30 Gregory Avenue, Passaic, N. J.

FOR SALE: 2—40 H.P.—220 VOLT—3-PHASE—60-Cycle 720 R.P.M.—MT-346 G.E. Motors, complete with controllers—perfect condition—willing to trade for 3 H.P.—1,200 R.P.M. Motors. Address Box No. 41, care of INDIA RUBBER WORLD.

(Classified Advertisements Continued on Page 626)

Classified Advertisements

Continued

MACHINERY AND SUPPLIES WANTED

WANTED BY NEW ENGLAND MANUFACTURER: ONE LABoratory calender in good condition. Address Box No. 39, care of INDIA RUBBER WORLD.

WANTED: FOUR 60" MILLS; ONE 8" TUBER; ONE 60" CALender. Address Box No. 43, care of INDIA RUBBER WORLD.

WANTED: HYDRAULIC PRESSES WITH HEATED PLATENS, 150 tons and up, also Banbury Mixer, Vulcanizer at least 5' diameter, and other good equipment wanted for expansion program. Address Box No. 50, care of INDIA RUBBER WORLD.

WANTED: COMPLETE RUBBER PLANT EQUIPMENT, INCLUDing Mills, Presses, Pumps, W.&P. or Banbury Mixers, Screens, etc. Send complete description, location, and prices. Address Box No. 52, care of INDIA RUBBER WORLD.

MISCELLANEOUS

WANTED: MILLING FACILITIES—(Long Is., B'klyn, or N.Y.C. area). If you are milling rubber for your own production and have spare time, we will pay you to mill for us. We require about 50 hours per month, cold milling. Address Box No. 46, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

FOR SALE: WELL-EQUIPPED SMALL RUBber plant now operating on soles and heels. Address Box No. 36, care of INDIA RUBBER WORLD.

WANTED: SMALL RUBBER PLANT WITH MILLS, calender, presses. Will lease or buy outright. Address Box No. 51, care of INDIA RUBBER WORLD.

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